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Escalators & Elevators Operations Procedure

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1.0 PURPOSE

Escalators and elevators are used extensively in all types of Entity facilities to provide an effective means of mechanical transportation for goods and people in and around a building, in a safe and comfortable manner.

The purpose of this document is to provide the Entity in the Kingdom of Saudi Arabia (KSA) an overview of the types of escalators and elevators used, and procedural guidelines for operations management of these systems in Entity facilities. These guidelines contain Operation's expectations consistent with the Expro approach, using best practices developed through industry experience and compliant with international standards.

These are minimum requirements for the efficient and safe operations of these systems. The Entity shall modify the requirements specific to its operational needs.

This document has been compiled utilizing the latest references available for the inclusion within the National Manual of Assets and Facilities Management (NMA&FM) but may be subject to change throughout the lifetime of the manual.

These guidelines contain a base structure for the Entities and/or Facilities Management Companies (FMC) from which a singular or set of documents can be developed to define the required scope of process and Standard Operating Procedures (SOPs) for the facility(s). This shall enable the management and senior management to have a clear understanding of the following:

- Staffing requirements
- Entity, client and the FMC roles and responsibilities
- Operational compliance to standards
- Equipment lifecycles
- Material sustainability
- Energy efficiencies
- Ability to gain analytical information to identify efficiencies throughout the operational management processes

2.0 SCOPE

The scope of this document is to provide direction to the Entity and service providers to improve and enable site-specific operation management processes in relation to the vertical people transportation systems (escalators, elevators) operational activities.

Such as, but not limited to:

- Performance monitoring of the systems, specialist maintenance supplier and footfall usage
- Controls and monitoring to achieve operational efficiency
- Customized control strategies
- Operational flexibility of change
- Improved operational management by specialist maintenance supplier
- Energy utilization and operational cost
- Integration with other systems to improve effectiveness
- Optimize quality service delivery

The operations management guidelines establish the uniform practical criteria and standards for escalator and elevator systems and their associated equipment to enable quality and cost-effective facilities maintenance that meet the needs and expectations of the Entity.

This procedure describes operations management actions for escalator and elevator on a generic level. Entities shall ensure that operation and maintenance instructions, relevant to the installation, are available. Methods in this document are created in line with the requirements of Safety Rules for the Construction and Installation of Elevators: EN 13015, EN 81-20 and EN 81-50 standards.

Due to the large number of escalator/elevator manufacturers, it is not always possible to safely describe every operations and maintenance procedure in detail. Escalator and elevator systems' operations procedures will need to be assessed on a case by case basis, depending upon the Original Equipment Manufacturer (OEM) recommendations.

This chapter should contribute to an Entity's operational policy that may cover various aspects of escalator and elevator systems. Staff responsible for the safe use of a system shall receive specific training before being permitted to handle a system or associated equipment. This document shall outline the key personnel involved in the operation, and general use of the system.

3.0 DEFINITIONS

Term	Definition
Airborne Noise	Noise transmitted through the air. In elevators usually generated by the machine, ropes, control panel, doors, guide shoes and other vibrating components
Alarm Bell	A bell used to call attention and assistance, which is operated by a pushbutton inside the car. This may be in the elevator shaft, on a suitable landing, or on the car roof
Alarm Button	A button for activating the alarm bell. Also activates voice connection if remote monitoring is used. Located in the car, with additional buttons on the car roof and underneath the car
Alarm Delay Time	The time the alarm button must be pressed until the signal is registered
Ascending Car Over Speed Protection	A safety system for stopping the uncontrolled movement of the ascending car
Balancing Weight	Mass in counterweight which saves energy by balancing all or part of the mass of the car, car sling and the rated load
Bed Plate	A steel or cast-iron platform on which a machine is placed
Brake	An electro-mechanical device used to prevent the elevator from moving when the car is at rest and no power is applied to the hoist machine. On some types of control, it also brings the car to a stop when power is removed from the hoist machine
Buffers	The buffer is a device located at the bottom of elevator designed to protect people. Buffers can stop a descending car by accumulating or dissipating the kinetic energy of the car
Cabin\Car	This is the main part of elevator which is designed for the shipment of goods and services or the passage of persons
Counterweight	A component which ensures traction between the traction sheave and the suspension ropes, and which comprises a set of weights to balance the weight of the car. The proportion of the load in the car often taken as 50 % of the rated load
Doors	As normal doors, elevator doors are also meant for entry and exit. An elevator door is of following two types: • **Manual Doors:** These types of doors are opened with the help of an individual to entering the elevator • **Automatic Doors:** Automatic doors are the type of doors which are automatically opened as it is powered by a door operator
Drive Mode	A predefined way of operation in which the elevator runs in a certain situation. Modes include normal drive, inspection drive, setup drive
Drive Unit	Drive unit is the part which contains a motor that drives the elevator
Electric Motor	In case the elevator faces any serious condition, electric motors help in preventing it and provides a smooth functioning of elevator s
Elevator Rails	Sliding up and down in the elevators is possible with the proper functioning of elevator rails
Elevator Shaft	Elevator cabin\car moves in this space. Depending upon the type of elevator, the location of the shaft can be varied
Elevators	Devices that move people and goods vertically within a dedicated shaft that connects the floors of a building

Term	Definition
Goods Elevator	An elevator equipped to carry goods and/or passengers
Hoisting Function	The equipment required to move the elevator car and counterweight. A defined combination of equipment required for a range of loads, rated speeds, acceleration and travel heights
Landing	The floor area in front of the elevator entrance
Landing Door	A door in the opening of an elevator shaft. Provides safe access to the elevator car
Machine Room	A room where the elevator machine and some electrification and control system components are located. Usually located above the elevator shaft but maybe remote (in the case of hydraulic elevators)
Maintenance Access Panel	A part of the elevator control system, including the user interface intended for serviceman and switches, fuses and brake release lever
Parking	A feature for a single elevator or an elevator group. With this feature, an elevator receives a signal to always return to a pre-selected landing after all landing calls have been completed
Pit	A portion of the elevator shaft extending from the still level of the lowest landing to the elevator shaft floor
Responsible Person	An individual who shall assume operations and maintenance management responsibilities on behalf of the owner
Safety Device	This is a mechanical or electromechanical device attached to the elevator for safety reasons. In case the elevator travels downward with a maximum speed or over the speed limit, safety device can maintain a safety and secure traveling
Safety Gear	A mechanical safety device attached to the car frame, and in some circumstances to the counterweight frame also. The device acts to stop and hold an over speeding car or counterweight through the use of clamping jaws closing around the guide rails. The device is activated by the speed governor
Speed Governors	The speed regulating system of elevators is known as the speed governor. If the elevator runs more than the speed limit, the speed governor controls the speed. It is usually attached to the bottom of the car and is also known as governor rope
Suspension rope	The ropes suspending the elevator car and counterweight. Not the same as hoisting rope
Traction test	A safety test to ensure that there is correct amount of friction between the suspension ropes and the traction sheave
Abbreviations	
AHJ	Authority Having Jurisdiction
BREEAM	Building Research Establishment's Environmental Assessment Method
BS	British Standards
CAFM	Computer Aided Facility Management
CCTV	Closed Circuit Television
CMMS	Computer (or paper) Maintenance Management System
DSP	District Service Provider
FMC	Facilities Management Company
HSE	Health and Safety Executive
HTM	Health Technical Memorandum
HVAC	Heating, Ventilation, and Air Conditioning
ISO	International Organization for Standardization
KPI	Key Performance Indicator
KSA	Kingdom of Saudi Arabia
LEED	Leadership in Energy and Environmental Design
LED	Light Emitting Diode
LMR	Lift Motor Room
MC	Maintenance Contractor
MEP	Mechanical, Electrical, and Plumbing
MRL	Machine-Room-Less
NFPA	National Fire Protection Association
NMA & FM	National Manual of Assets and Facilities Management

Term	Definition
OEM	Original Equipment Manufacturer
OOH	Out of Hours
PM	Planned Maintenance
RFP	Request for Proposal
RP	Responsible Person
SBS	Saudi Building Codes
SEC	Saudi Electrical Codes
SG	Safety Group
SLA	Service Level Agreement
SOP	Standard Operating Procedures
WO	Work Order

Table 1 Definitions

4.0 REFERENCES

- Building Research Establishment's Environmental Assessment Method (BREEAM)
- Chartered Institution of Building Services Engineers (CIBSE)
- Emergency lighting (BS5266-1) – Code of Practice for the Emergency Lighting of Premises
- International Organization for Standardization (ISO/IEC 17020) – Conformity Assessment Requirements for the Operation of Various Types of Bodies Performing Inspection
- International Organization for Standardization (ISO 25745-1) – Energy Performance of Lifts, Escalators and Moving walks. Energy Measurement and Verification
- KONE MBM-2 (Modular Based Maintenance) – Method on Generic Level for Elevators
- Leadership in Energy and Environmental Design (LEED)
- Lift and Escalator Industry Association, LEIA
- Elevator s and Service Elevator s (BS 5655-6) – Code of Practice for the Selection and Installation of New Elevators
- Lifts and Service Elevators (BS5655-11) – Code of Practice for the Undertaking of Modifications to Existing Electric Lifts
- Lifts and Service Elevators (BS5655-12) – Code of Practice for the Undertaking of Modifications to Existing Hydraulic Lifts
- Lifts and Service Elevator s (BS7255) – Code of Practice for Safe Working on Lifts, 2011
- Health Technical Memorandum (HTM-00) Policies and Principles of Healthcare Engineering
- Health Technical Memorandum (HTM-05) Fire Safety
- Maintenance for Lifts and Escalators (EN 13015) – Rules for maintenance instructions
- National Fire Protection Association (NFPA 70) – National Electrical Code
- National Manual of Assets and Facilities Management (NMA & FM) Volume 5 Chapter 10 – Life Safety Systems
- Safety Rules for the Construction and Installation of Lifts (EN 81-20) – Lifts for the Transport of Persons and Goods. Passenger and Goods Passenger Lifts
- Saudi Building Codes (SBC)
- Saudi Electrical Codes (SEC)
- Serco Maintenance Schedules and Practices
- Safety Rules for the Construction and Installation of Lifts (EN 81-50) – Examinations and Tests. Design Rules, Calculations, Examinations and Tests of Lift Component
- Safety Rules for the Construction and Installation of Lifts (BS EN 81-28) – Lifts for the Transport of Persons and Goods. Remote Alarm on Passenger and Goods Passenger Lifts

Note: A number of references above refer to the term 'lifts' within their title. This is to be understood as referring to 'elevators used throughout the text of this document.

5.0 RESPONSIBILITIES

The Ministry is the final Authority Having Jurisdiction (AHJ) unless specifically stated otherwise in other sections of the NMA&FM. If a conflict is discovered between these guidelines and other operations management documents, it shall be brought to the attention of Entity, who will provide a resolution or direction to ensure that all escalator & elevators operational goals and requirements have been met.

5.1 Organizational Structure

The organizational chart provided below is based on the Health Technical Memorandum (HTM) guidelines. However, some Entities may utilize an internal or fully outsourced process flow depending on the adopted Standard Operating Procedures (SOPs) of the facility.

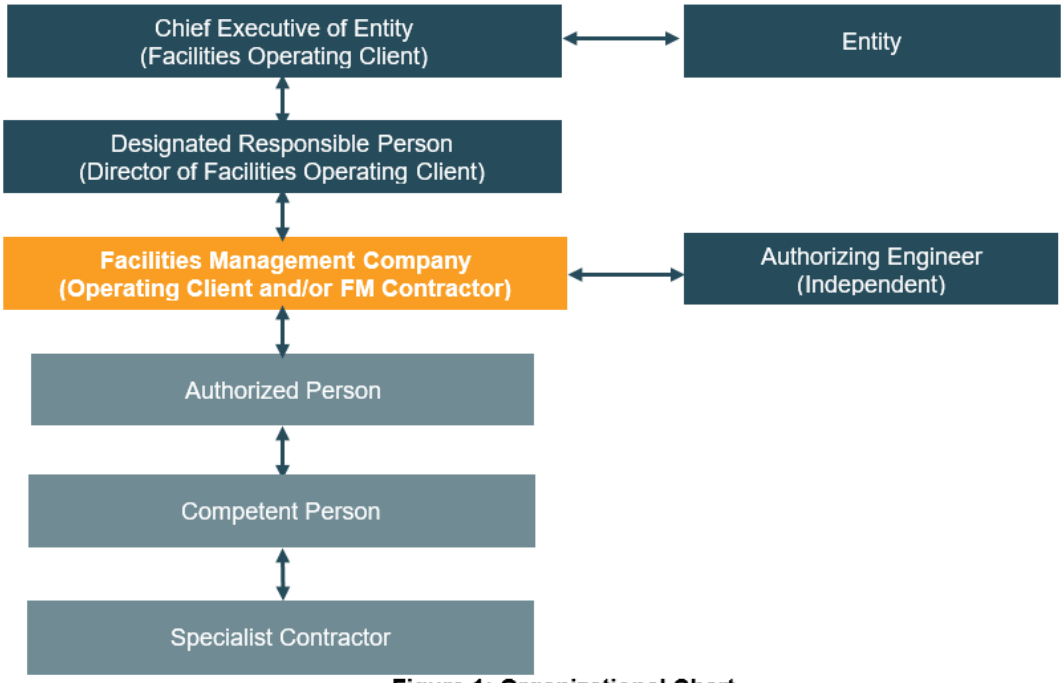

Figure 1: Organizational Chart

The responsibilities of the roles mentioned in the above chart are as follows:

Role	Description
Ministry	Governmental Entity having Jurisdiction for the region. Setting governing standards
The Responsible Person (RP)	The RP employed directly by the Entity is the "Duty Holder" of the engineering systems and the staff who operate those systems, and is overall responsible and accountable for the design, installation, operation and maintenance, and ensuring control of those systems The RP has a legal responsibility for ensuring that the Entity has complied with the relevant legal regulations pertaining to those engineering systems and the staff involved. The RP shall ensure that the systems are kept up to date with the latest relevant legal regulations. The RP shall not be the Authorizing Engineer (AE)
Facilities Management Company (FMC)	The FMC is an appointed client representative who in collaboration with the client controls the maintenance engineering departments; and who is responsible and accountable for the APs and CPs as well as the site engineering systems, maintenance, and ensuring control of those systems is in line with the client SOP for the maintenance activities
The Authorizing Engineer (AE) (independent)	The AE is appointed by the Responsible Person (normally under the recommendation of the client), to take responsibility for the effective management of the safety guidance. The AE shall possess the necessary degree of independence from local management to take action where necessary and alert the Chief Executive (in the event the local management do not take action to avoid harm)

Role	Description
Authorized Person (AP)	An individual who has been appointed by the AE (or by an authorizing body within the Entity); who is trained, competent, skilled, experienced, responsible, and has gained the necessary site knowledge, to operate and maintain the system in a controlled and safe manner. The AP is responsible for work or testing carried out on the system
Competent Person (CP)	An individual with the necessary training, and who has been appointed by an AP (or by an authorizing body within the Entity), after conformation of competence, knowledge, skill, and experience. The CP can execute the required actions within a Permit to Work (PTW) and/or other directional documents as may be assigned to him
Maintenance Contractor (MC)	The MC is the individual or organization responsible for the supply of the equipment, its installation, and maintenance

Table 2: Designated Roles and Responsibilities

5.2 Safety Group

As per HTM, a Safety Group (SG) shall be established. Outside of a healthcare environment, the establishment of such a committee would be advised as best practice.

The role of this group is to discuss current issues, solutions, and forthcoming potential problems (i.e., with new projects or dealing with new legislation), to assist in avoiding project clashes, outages, and taking/formulating mitigating actions.

The diagram below provides an example of structure that shall be employed as best practice, SG designations may change dependent on the FMC organization structure:

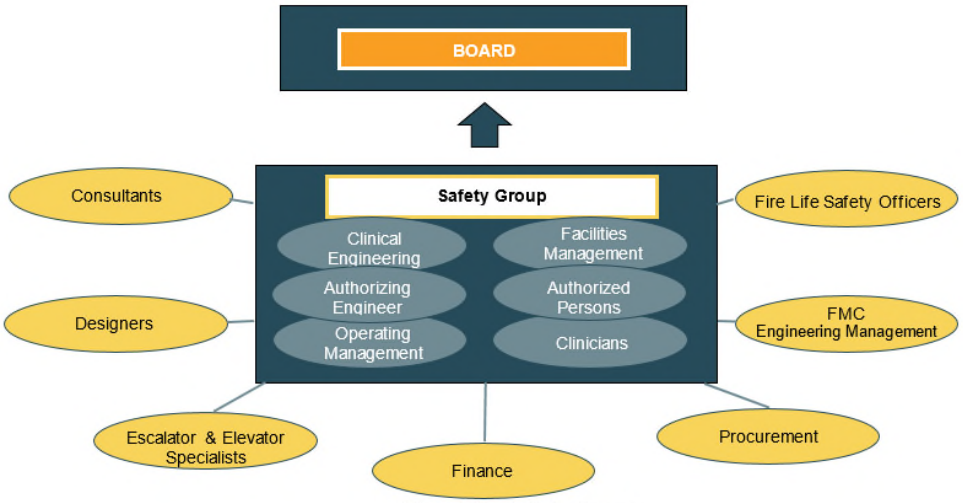

Figure 2: Safety Group

5.2.1 Responsible Person

The RP shall retain reports of the equipment condition made by a MC (thereafter when updated) and shall keep a record of maintenance activities and inspections for each escalator and elevator. To support the RP in this task, the MC shall provide the RP with a record of maintenance requirements and activities in-line with the most updated governing standards.

Technical information/wiring diagrams are essential for the safe investigation of faults, and such diagrams are the property of the RP and not the MC. The RP shall monitor the operation, carry out the checks, and notify the MC of any defects found.

- **Competence of MCs:** The RP shall ensure that any work carried out on site is performed only by authorized and licensed specialist contractor utilizing certified AP and CP, and overseen by FMC staff
- **Emergency Alarm Bell\Calls:** Arrangement shall be put in place by the RP to confirm that there is a permanent communications link for the elevator emergency alarm system. Consideration is drawn to the requirements of BS EN 81-28. The responsibility for this link is usually with the RP
- **Trapped Passenger Rescue Procedures:** The RP shall retain landing door unlocking keys and machinery access keys, and secure and establish control measures for their issue and use. Rescue and release procedures must usually be carried out only by trained and competent personnel. Reference shall be made to BS 7255
- **End of Maintenance Agreement:** At the end of the maintenance agreement, the RP shall confirm that any documents, tools, drawings, including essential special tools, software access codes, and equipment returned by the MC are retained so that they can be made available to the subsequent maintenance provider. This shall also include third party inspection certificates for periodic insurance inspection

5.2.2 Maintenance Contractor

As the system licensed specialist, the MC shall report directly to the RP for any operations or deficiencies to the escalators and elevators, that may jeopardize safety or reported by third party inspection team. Work on site is to be performed safely according to BS 7255, without risk to those executing the work or persons in its proximity. Where issues of safety are revealed that cannot be easily addressed by procedures adopted by the MC, the contractor shall report them in writing to the RP, discuss and agree an appropriate resolution.

5.2.2.1 Reporting procedures

The MC and RP are to ensure that formal reporting procedures are undertaken, at no less than six (6) monthly intervals; ideally following third party inspections when the observations can be discussed and remedied. When a new MC is appointed and takes over the maintenance of the equipment or within a reasonable time, they shall survey the site and provide an initial condition survey report to the RP. Subsequently, the MC shall update this report with any changes of equipment or subject to the requirements of the standards. Reports shall be provided to the RP on an agreed time scale regularly, the reports shall contain the details of the site such as:

- Site address
- Location where units are fitted within the building
- Identification number
- Date of maintenance/inspection

6.0 PROCESS

This section describes different types of escalators and elevators that may be found within an Entity. It is not designed to provide a comprehensive list of actions to be undertaken as this will need to be compiled by the individual Entity based upon specific requirements and goals. Further guidance can be found in the list of references provided.

Elevators are used for vertical movement inside a building and comprises of one or more cars, suspended in a structural sling of metals channels that can be moved up and down the levels of the building by some driving controlling mechanism.

Due to the multiple elevator manufacturers, it is not always possible to describe every operational process in detail. The Entity shall ensure that relevant OEM instructions are available and are followed during any operations

6.1 Escalator and Elevator Types

There are three main types of elevators are commonly used and described here. Refer to the OEM or installing contractor for specialist applications or future development. Typical examples are as follows:

6.1.1 Hydraulic Elevators

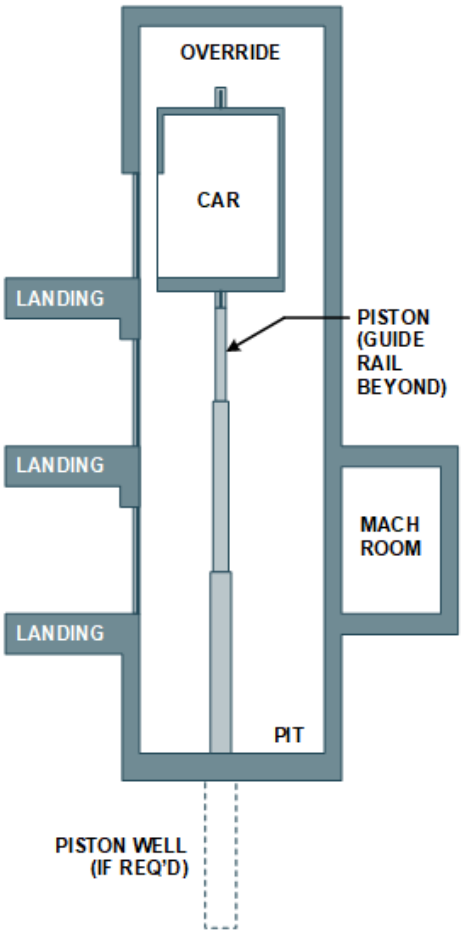

Figure 3: Hydraulic Elevators

Hydraulic elevators are typically used in low-rise applications (2–8 level buildings). They are supported by a piston at the bottom of the elevator that pushes the car up as an electric motor forces oil or another hydraulic fluid into the piston. The elevator descends as the valve releases fluid from the piston and travel

at a maximum speed of 200 feet per minute. The machine room for hydraulic elevators is located at the lowest level adjacent to the elevator shaft.

Hydraulic elevators have a low initial cost and their ongoing maintenance costs are lower compared to the other elevator types. However, hydraulic elevators use more energy than other types of elevators because the electric motor works against gravity as it forces hydraulic fluid into the piston. A major drawback of hydraulic elevators is that the hydraulic fluid can sometimes leak, which can cause a serious environmental hazard.

6.1.2 Geared and Gearless Traction Elevators with Machine Room

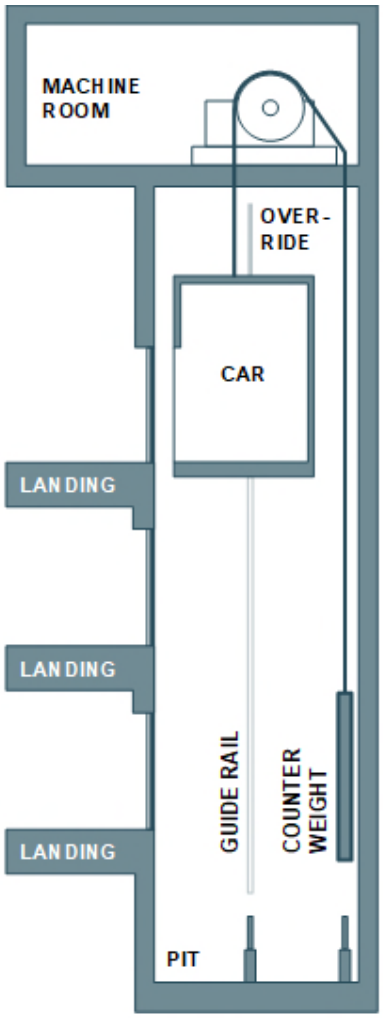

Figure 4: Geared and Gearless Traction Elevators with Machine Room

Traction elevators are lifted by ropes that pass over a wheel, known as a sheave, attached to a motor that sits above the elevator shaft. These elevators are used for mid- to high-rise applications due to their increased speeds and maximum traveling heights. A counterweight makes the elevators more efficient by offsetting the weight of the car and occupants so that the motor doesn't have to move as much weight. There are three types of traction elevators used today: geared, gear-less, and machine-room-less.

It is vital that traction elevator ropes and sheaves are measured on a regular basis. As they wear, the traction between the sheave and the cables is reduced and slippage becomes more regular, which reduces the efficiency and can become risky if left unchecked.

Traction elevators have height limitations that are governed by the length and weight of the cables or ropes. New materials that are stronger and lighter, such as carbon fiber, will allow traction elevators to attain new

heights. Electric traction drives shall use Variable Voltage Variable Frequency (VVVF) technology. Wherever possible, the drive shall also be regenerative in order to contribute to the energy classification of the building as per BS5655-6.

6.1.3 Machine-Room-Less Traction Elevators

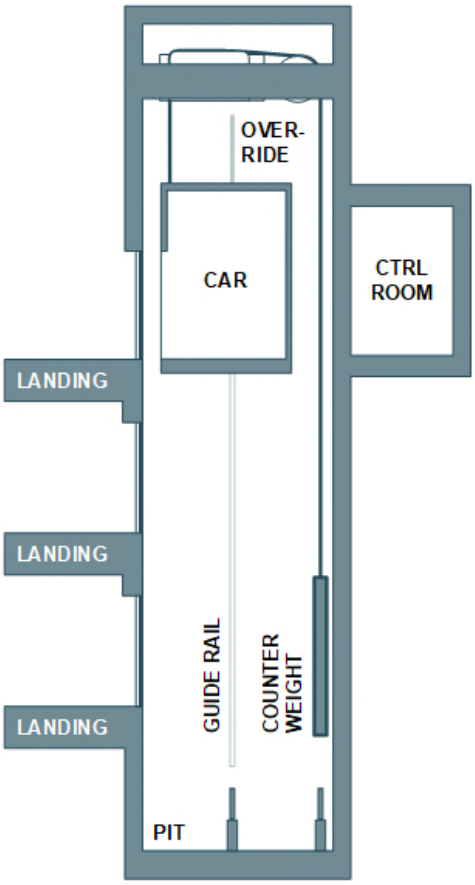

Figure 5: Machine-Room-Less Elevator (MRL)

Machine-Room-Less (MRL) elevators are traction elevators that do not have a dedicated machine room above the elevator shaft, instead the traction hoisting machine is installed either on the top side wall of the hoist-way or on the bottom of the override space. This can be accessed from the top of the elevator car when maintenance or repairs are required. The control boxes are placed in a control room that is adjacent to the elevator shaft on the highest landing and within around 150 feet of the machine.

MRL elevators are becoming the preferred choice for vertical transportation for mid-rise buildings where the travel distance can be up to 250 feet. They are energy efficient, require less space, and their operation and reliability are on balance with gear-less traction elevators.

6.1.4 Step Type Escalator

Probably the most common type of escalator used throughout the world, practical and very time efficient for continuous floor to floor people movement thought a facility.

6.1.5 Wheelchair Escalator

A specialist escalator that requires the person of determination to call for assistance. They provide/transform a level 3 step platform (this is not automated and requires a facility assistant to attend and initiate the transformation process) that enables a wheelchair to safely travel. These escalators can be useful in facilities without elevators, however, are not practical or time efficient if an elevator is accessible.

6.1.6 Spiral Escalator

Although not a new concept in design, they are not a widely installed type of escalator, and are predominantly installed for their design rather than practicality or efficiency.

6.1.7 Levytator

This type of escalator is innovative in a way that it has multiple curves throughout the travel length. As with the spiral type, this escalator is design driven rather than practicality.

6.1.8 Moving Walkways

Elevated moving walkways are becoming a more common site within facilities that require people travel between floors with luggage and other things.

Note: For the purpose of this document we will only include escalators such as described in **Section 6.1.4** of this document, as the operational and specialist support are generic across all types.

6.2 Types and Short Description: Elevators and Escalators

There are variations on each type of elevator, but most come to the three main configurations. Other elevator that you may have in your facility are as follows.

- Hospital patient bed elevators
- Designated fire fighter
- Passenger elevators
- Goods elevators
- Capsule/Scenic elevators

6.2.1 Patient Elevators (Bed Lifts)

These are specific to the healthcare sector and have dedicated elevators primarily used for patients who need to be moved to specialist areas such as Operating Rooms (OR), Intensive Care Units (ICU) with the most extreme urgency. Elevators of this type have high precision running conditions to consolidate speed, comfort, safety and capacity.

In addition, these transport patients who have versatility issues and require a bed, trolley, or wheelchair for mobility. Also, the patient elevator plays its medical role to facilitate the rapid rescue of patients express by being interfaced with the elevator control system, fire detection, and alarm system to support the evacuation management strategy.

When engaging with a specialist vertical transport maintenance company, staff attendances and maintenance shall be considered for these facilities to ensure that patient welfare is not impaired due to breakdowns and unavailability. These systems must be checked to ensure that they operate during various failure modes such as when building power is lost, these elevators shall operate in conjunction with emergency power supply arrangements.

6.2.2 Designated Firefighting Elevators

Firefighting elevators are the exclusive use of a passenger elevator by the fire service to carry firefighters and their equipment to the required floors in the event of a fire. Firefighting elevators are required in buildings where the floors are more than 18m above or more than 10m below the fire service vehicle access level. The elevators operate as normal passenger elevators with the capability to switch into an emergency state, if required due to their fire rating integrity.

The firefighting elevator be integrated into the building emergency condition strategy; therefore, it will have dedicated emergency power supplies available to tackle extreme conditions. In addition, these elevators will have a different control strategy associated with them. Machine rooms and shafts will be rated to maintain service in the event of a fire. Shafts will be protected with pressurization systems to provide fresh air at a positive pressure. This must be checked in accordance with the guidelines in NMA & FM Volume 5 Chapter 10 – Life Safety Systems.

6.2.3 Passenger and Capsule/Scenic Elevators

Dedicated for the transportation of visitors, public, and staff; these elevators are not designed for goods movement. During a fire or emergency evacuation these elevators will operate under the Emergency Procedure SOP/cause and effect protocol of the facility.

6.2.4 Goods Elevators

Dedicated for the transportation of goods, these elevators are not designed for dedicated people movement. However, during a fire or emergency evacuation these elevators will operate under the emergency procedure SOP/cause and effect protocol of the facility. This will normally mean that they directly travel to the emergency protocol level of the facility and remain inactive until the alarm status is cleared. In exceptional circumstances, they may have an emergency fire override protocol and be accessible for firefighters dedicated use.

6.2.5 Escalators

Escalators may be installed within all facility types covered within this document. They are considered as special applications and therefore Entities shall undertake a facility assessment, based upon the users and continuous operation of these systems. The engagement of a specialist provider follows the requirements highlighted above for elevator applications.

This equipment is designed for the movement of large volumes of staff, visitors, patients, and general public where elevators would be inefficient. They generally operate to a maximum height of around 30 meters (specialist installation), often over 1 – 2 floors.

During a fire/emergency situation they will be designed to operate and follow the emergency procedure SOP/cause and effect protocol of the facility.

Escalators will directly slow down to stop or auto travel to level 1, slowing to stop cycle, during an alarm situation.

6.3 Escalator/Elevator Alarms and Status Monitoring

All people, firefighter and goods transport systems shall, wherever possible, be monitored for alarms and status. Effective systems shall be in place for both off-site and on-site response to equipment and user alarms.

Some vertical transportation systems require integration with other systems including, but not limited to, the fire alarm system, related smoke control curtains, fire command center systems.

6.4 Risk Management

Critical/fire elevators within a facility have an impact on the overall life safety of staff, patients, visitors or general public. Hence, it is crucial to identify them clearly ensuring that safety, comfort, and amenities of a facility, particularly in hospitals are maintained.

The Entity may wish to plan for major plant failure by procuring critical assets such as auxiliary shaft ventilator systems, ladders, hoists and by ensuring that process to minimize downtime, and inconvenience to end users are in place.

The loss of service of these units would seriously degrade the ability of the premises to deliver optimal patient care to users. In order to ensure reliable service provisions, it is essential to inspect, verify, and maintain these systems at appropriate intervals. For many of these systems, a PTW will need to be

completed to ensure that taking the system out of service does not compromise the activities of the user department. In any event, it will be necessary to liaise with the user department when switching the system off for routine inspection and maintenance or for periodic testing.

6.5 Documentation

Compliant operations management documentation is necessary for effectively managing the day-to-day operations of the engineering services of a facility. The documentation should consider the following:

6.5.1 Define the Escalator/Elevator equipment components and requirements

The Entity and FMC shall be aware that the document encompasses single or portfolio of facilities of varied sizes and/or types, which may or may not include the same equipment. Therefore, diligence around the documents developed structure shall be required to enable ease of inclusion and/or exclusion at contract site level.

Outline the escalator/elevator systems that may be found in the facility environment and include scope of use. Some facilities will include all the above. However, inclusion into the facilities bespoke document shall be only for those found within the Entity's facilities.

6.5.2 Define Roles and Responsibilities

Outline the management and staffing including specialist support roles and responsibilities It must be understood that adopting or being requested by the client to adopt specific managing standards, i.e., NFPA HTM, BS, EN standards will affect how the roles and responsibilities are structured within the operations management process. When formulating this guide document, the BS standards are mainly used to demonstrate how the structure may be compiled. For the facilities bespoke document, all standards shall be considered, and the most effective and/or stringent elements adopted.

6.5.3 Define Procedures

Outline the minimum procedures: start up, shutdown, monitoring, and emergency response actions. It is the responsibility of Entity and/or FMC to ensure the following:

- Descriptions and charts are used as a baseline, and not as a comprehensive final element of the operations management document
- A comprehensive document is produced and/or developed coinciding with the baseline guides
- It is disseminated as a working document, being reviewed on a regular basis thereafter to ensure all information and process content are updated and relevant

6.6 Operations Management and Requirements

6.6.1 Operations Management Plan

The operations management plan addresses the support systems for managing maintenance activities including:

- Maintenance planning to include access times or Out-of-Hours (OOH) attendances
- Directing and controlling maintenance (impact and safety to users)
- Management of elevators shutdown for major overhaul
- Maintaining records and reporting of maintenance activities
- Analyzing and optimizing maintenance performance (traffic analysis)
- Developing cost and resource estimates for ongoing elevators asset maintenance

This plan includes the following key areas:

- Developing and refining maintenance management procedures
- Continuously reviewing and optimizing the maintenance strategy
- Identifying the use of reliability cantered maintenance to optimize the replacement/renovation/ maintenance of the vertical transport assets

6.6.2 Escalator/Elevators Operations

Maintenance activities are a statutory and compliance requirement and consist of planned and unplanned maintenance to make sure that each elevator is safe to use and continuously available. Maintenance is a continuous process and involves different personnel at the various stages.

Considerations for elevators operations shall include:

- Monitoring elevator operations
- Performing analysis of traffic flow/car waiting times
- Elevator cleanliness, in conjunction with soft service contractor
- Elevator car interiors (handrails, mirrors, finishes)
- Control panels locked when not in use
- Operation in defined modes
- Availability of keys and procedures for issuing
- Maintenance access times
- Motor room access controls
- Heating, Ventilation, and Air Conditioning (HVAC) available for motor rooms to prevent overheating
- Car Closed Circuit Television (CCTV)
- Car intercom system checks
- Auto-dialer functionality and response
- Interface with fire alarm system for grounding/alt floor, doors open (fire mode)
- Ride quality
- Insurance checks in date

Considerations for escalators operations shall include:

- Routine inspection of steps as part of maintenance requirements
- Check of comb plate condition
- Line painting of danger areas
- Safety brushes intact (particular importance when passengers wear long clothing such as thobes and, abayas) which can become entangled
- Belts and rollers condition
- Gearbox oil condition and level
- Pit drainage operational (if external)
- Pit access plates secured correctly and not a trip hazard
- Suggest to stakeholders to reverse direction for even wear
- Damaged steps to be reported and replaced
- Monitor of ride quality

6.6.3 Scheduling Requirements

The facilities manager/RP operational scheduling requirements include:

- Planned Maintenance (PM) on a regular basis in order to prevent elevator failures and achieve uninterrupted use and maintain each system's commissioning standards
- Unplanned Maintenance (UM) maintenance following unplanned failure of the elevator such as repairs and rectification, or where incorrect use has incurred resulting in a failure
- PM on critical care elevators shall be after business hours unless otherwise agreed by the client RP
- PM on elevators other than critical care systems shall be scheduled in conjunction with the RP according to the agreed maintenance schedule. This must be performed in a manner and at a time that minimizes the impact to building users
- Specific Service Level Agreement (SLA) for elevators maintenance including scope of works and frequencies shall be followed as per the contractual agreement
- Assure compliance with all relevant technical standards, OEM recommendations, and alignment with required local statutory regulations

6.6.4 Required Management Safety Policies and Procedures

The facilities manager/RP is the person responsible for the practical implementation of management safety policies and procedures on the elevators system at the site.

- Oversight management of MC undertaking planned and unplanned maintenance works
- Management of the first response team in support of MC
- Providing a focal point for liaison i.e. submitting elevators overhaul plan and obtaining agreement on maintenance shutdown
- Managing and coordinating with MC to make sure necessary spares and consumables are readily available
- Maintain control and ownership of critical spares purchased by the Entity, ensuring the MC conducts maintenance and checks on these items as necessary
- Managing and coordinating with MC to make sure risk assessments are carried out, recorded, and communicated to maintenance employees prior to any work, test or examination commencement
- Managing the review process to make sure all written risk assessments are clearly documented and recorded for all routine operations
- Manage the process for the issuing of all instructions in accordance with site rules and procedures
- Reviewing all reports submitted by MC
- Managing the process to make sure that all safety documentation is correctly matched to the maintenance tasks
- Ensuring that the MC provides trained and competent persons for operations management and maintenance
- Managing, reviewing, and approving any MC specific site safety policies or procedures to be implemented as part of their services and making sure that it is stored within the Computer Aided Facility Management (CAFM) system as part of the asset register
- Reviewing and evaluating maintenance outcomes reported in CAFM system during the undertaking of maintenance activities by MC and the first response team
- Reviewing elevators monitoring information/data to establish trends and identify opportunities for potential improvements to the service
- Overseeing the contractual aspects of the services undertaken by MC
- Review contractor performance against KPIs and identify required improvements. KPI's are reviewed periodically and amended to suit local requirements
- Review and manage all complaints/compliments received from users regarding the elevator system
- The RP/FMC to outsource the maintenance and repair responsibilities for the escalators and elevators to a competent contractor who can perform maintenance as per the OEM instructions. A review of shortlisted contractors to be undertaken and assessed to ensure that the contractor meets with the contractual obligations within the Request for Proposal (RFP) document, and subsequent contract. Especially in terms of meeting with statutory compliance requirements
- The following have been identified as key employees for the elevator system and their specific responsibilities are outlined for the management and implementation of this vertical transport maintenance management plan. These individuals must be notified to the client and any changes to be notified at the earliest opportunity for changes in personnel or their roles:
    - Facilities manager/RP
    - MC/service provider (AP)
    - First response team/CP

6.6.5 Maintenance Contractor Process Responsibilities

The MC is responsible for making sure that there are sufficient and suitable resources available to enable the elevator system to be operated, maintained and repaired safely and effectively.

They will apply effective maintenance programs that are continuously adjusted to respond to the changes in the operating conditions and age of the equipment.

Specialist engineers shall be on site to undertake maintenance activities and providing first response to faults during the agreed operating hours. The MC is to have employees, or approved agents on call after operating hours to assist the first response team. Where necessary for operational requirements, the MC may provide 24/7/365 attendance, for instance in healthcare applications where patient welfare cannot be

compromised. These considerations and costs shall be highlighted to the client in advance, to avoid delays. All maintenance is to be carried out as per OEM's instruction manual.

The specific duties of MC are as follows and shall be KPI monitored:

- Endorse applicable safety policies and procedures
- Comply with the maintenance contract conditions
- Provide accredited training to the first response team for passenger release service
- Provide an 'entrapment call out' arrangement as specified within the contract for attendance time
- Undertake planned maintenance tasks as per the agreed schedule
- Undertake unplanned maintenance service
- To appoint and make sure that only qualified and competent persons carry out work on the elevator system services and installations
- Update and maintain all records and drawings relating to elevator system installation
- To carry out inspections of the elevator installations and provide third party certification as per the local legislations
- Provide annually a service plan identifying all proposed PM work to be undertaken in the next contract year, and an overview of upgrades work, including asset replacement, major overhauls, refurbishments, and those that are to be implemented over the next five years
- To submit monthly service and call out reports on elevator system to the facilities manager/RP
- To submit reports where changes in maintenance or operational requirements are identified
- Abide with applicable site procedures – 'Control of Subcontractors and Safe Systems of Work'

Unless otherwise specified, the MC has the day-to-day responsibility to manage the inventory of all materials and consumables required for use in the maintenance of the elevator systems.

The level of spare parts, materials and consumables to be held on/off site shall be determined by MC. A list of equipment will be provided to the facilities manager. Use of critical spares is to be reported as soon as they are used and measures to be in place for re-stocking. Usage shall be reported as part of the periodic client contractor reporting methods, highlighted above.

6.7 Start-up Procedures

A start-up procedure is a reference document to be used when preparing a process to bring a system back into operation from an offline position. The actions within the procedure are intended to ensure that a methodological approach is taken when bringing an escalator or elevator back online.

Start-up procedures for escalators and elevators shall include the following, but not limited to:

- Health and safety
- Preapprovals
- System readiness
- Prestart checks
- Start checks
- Travel and landing tests
- Notifications

6.8 Shutdown Procedures

A shutdown procedure is a reference document for a planned activity to take an escalator or elevator offline. The shutdown procedure shall be clear, prescriptive, and well understood. The specific steps often mirror those taken with a start-up procedure but include additional consideration for the effect on critical operations and other building activities connected to the process. Particular Health and Safety Executive (HSE) considerations shall be taken for elevators operating within a shared transit shaft.

Escalators and elevators shutdown procedures shall include the following, but are not limited to:

- Health and safety
- Preapprovals
- Standby system condition

- Pre shutdown checks
- Routine stop
- Post stop checks
- Notifications

6.9 Daily Reports/Monitoring

Key Performance Indicators (KPIs) which are agreed upon between the FMC and the specialist contractor such as Work Order (WO) completion times are within an agreed threshold time, recorded as a percentage for the KPI, graded according to % category, i.e.

Work Order Completion Times KPI Result %	Grading
95%<100%	Excellent
80%<94%	Good
70%<79%	Room for improvement
50%<69%	Poor
0%<49%	Unacceptable

Table 3: KPI Performance Grading

Facilities management/service providers shall consider the following items need to be monitored:

- The primary sources of supply supporting an elevator system shall be monitored for any outages and their reasons must be recorded. In some cases; the District Service Provider (DSP) will be contacted directly for an explanation if there was a prolonged power outage
- WO under the Computer (or paper) Maintenance Management System (CMMS) shall be actioned in accordance with the agreed contract requirements based on priorities and urgency level such as routine, urgent and emergency WO, daily checks for elevators car to include the following:
    - Telephone for emergency call functionally
    - General light/emergency light functionally
    - Telephone numbers to contact during emergency are active
    - Certificate provided by elevator inspector/factory inspector is valid
    - Carrying capacity in KGs/number of passengers is not knowingly exceeded
    - Landing level and internal/external door operation is correct
    - Check for undue noise, scraping, knocks, and bangs
- Suitable trained staff shall be employed by the service provider for the purpose of monitoring elevator plant and equipment. If staff are not suitably qualified, competent or available, then the service provider shall arrange for the appointment of an approved/authorized contractor to provide this service or support
- Energy usage shall be monitored and recorded in relation to site volume, occupant numbers, and specialism i.e. service elevators vs passenger elevators. Seasonal variations in energy usage shall also be monitored to assist in highlighting anomalies in footfall, occupancy, and working time across the sites

6.10 Emergency Response/Actions

The aim of this emergency procedure is to provide guidance and a structured approach to the management response in case of a major failure of an elevator system, and to safeguard users/occupants from any such failure.

The following procedures are designed to instruct and advise on the operational requirements for dealing with such an elevator system. It is not considered a definitive guide on emergencies as circumstances of the incident will ultimately determine the course of action taken.

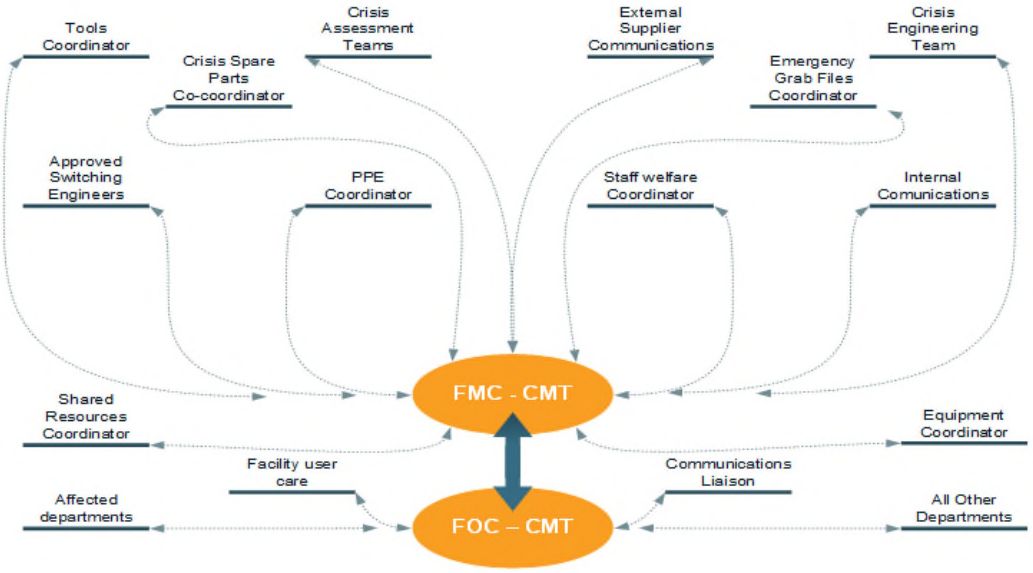

Figure 6: Emergency Response Actions

For the FMC (operations), this will be focused around management for the reinstatement and continuation of critical elevators service.

6.10.1 First Response Team

The MC first response team will respond to the elevator system faults as per the site operational plan, including those highlighted above as 'call out'. The first response team will also provide the passenger release service, in accordance to the operational and contractual arrangements, particularly in respect to agreed attendance times. The first response team must adhere to all safety policies and procedures as defined in the 'Safe Systems of Work Management Plan' for each site. Where site Mechanical, Electrical, and Plumbing (MEP) engineers have been trained in entrapment procedures, the MC is to periodically assess these staff to ensure that they meet with the requirements. Should refresher or continuation training be necessary, this is to be reported to the client. In all cases, non-vertical transport personnel may only carry out these procedures if the Entity Insurers have been consulted and agreed.

6.10.2 Emergency Release

With every elevator machine, there shall be information on the safe release of passengers. The building facilities manager should have members of staff trained specifically to undertake such a task. Information on release of passengers may be found in the OEM instruction manual supplied with the equipment. Where relevant, due to the carrier being enclosed, such as elevators are provided with an emergency communication system linked to a rescue service or building control room. The MC shall ensure that alarm calls from the equipment are received and acted upon. The response of the MC shall be clear as part of the maintenance agreement.

Arrangements shall be put in place between RP and MC to ensure that there is a permanently available communications link. The responsibility for this link is usually with the RP. The owner of a passenger/goods elevator needs to keep, as described in EN 81-28, the two-way means of communication efficient and linked to 24 hours rescue service for the whole time that the installation is being utilized. This communication shall be tested on no less than a weekly basis and recorded at site as part of the Life Safety Systems (LSS).

The RP shall keep landing door unlocking keys and machinery space access keys secure and establish control measures for their issue and use. In many cases, passengers trapped in enclosed elevator platforms or in elevator cars are not in immediate danger. Release and landing door unlocking procedures undertaken by untrained staff could put the trapped passengers in risk.

Persons engaged in the maintenance and the inspection of elevators, or in performing the release of passengers, may need to open a landing door while the car is not at that landing, such as in order to have access to the pit or to the roof of the car. In such cases it is vital that the RP only makes the unlocking key available to trained and authorized staff, and any staff (other than those working on the elevator) be prevented from making use of such a landing entrance. Whenever a landing door is unlocked, or open with the car not still or at the level of that landing, there are many hazards to which persons on that landing might be exposed. All protective barriers shall incorporate relevant safety signs.

The training of individuals in the RP's organization is usually appropriate only where there are suitably competent and trained persons available. When the training is agreed, this shall be provided by the maintenance provider who must be invited to risk assess the equipment and assess the competence of those being offered for training. Refresher training shall be provided at least annually. The MC shall undertake the training and then assess the competence of the trainees.

6.11 General Operational Requirements

6.11.1 Computer Aided Facility Management (CAFM)

CAFM is the core enabling technology used by facilities management to assist in delivering the services. All planned and unplanned tasks carried out by the MC and facilities management are recorded in this system against identified assets. All information relating to elevator assets are recorded within CAFM to enable such as asset reporting, asset analysis, asset lifecycle. This shall be further described in the site procedures and work instructions. In many cases MCs use the OEM dedicated systems for recording of maintenance activities. In this case the MC shall provide reports to the client on no less than a monthly basis of completion of 'maintenance modules' from this system.
The specific records and information of maintenance service are as follows:

- Unplanned maintenance and minor works
- Upgrade works
- Additional works
- PM scheduled works
- Life cycle works

6.11.2 Maintenance Scope of Works and Frequencies

All elevators shall be maintained to guarantee safety and performance at levels consistent with the OEM maintenance requirements. This is to safeguard all users and goods transported by elevators and all personnel involved in maintenance or inspection. EN13015 provides rules for maintenance instructions, for all new equipment.

Regular maintenance of the elevators shall be carried out, to ensure, in particular, the safety of the installation. The safety of an installation shall consider the ability to be maintained without causing injury or damage to health. Regular maintenance shall be carried out to ensure reliability of the installation. NMA & FM Volume 6 Chapter 17 highlights the maintenance tasks that shall be undertaken.

6.11.3 Control Panel

Control panels and drive cabinets shall be checked by the MC on no less than a weekly basis to ensure that there are no defects present or conditions likely to impede operations. In particular, the following:

- Ventilation during operation and sufficient temperature to provide adequate cooling
- Only rescue equipment and tools may be stored in Elevator/ Lift Motor Rooms (LMRs)
- Sufficient lighting in place for maintenance activities (200 lux)
- Logbook in place to record maintenance and any defects, attendances
- Operating procedures to be available, and in place
- Doors and panels are secured
- Protection devices are labelled

6.11.4 Lights Inside Elevator Car

To meet the recommendations of ISO 25745-1, the lighting shall be reduced to a lower level of energy consumption when an elevator is parked for more than five minutes at a floor with its doors closed. Elevator car lighting shall be of a low energy type i.e. Light Emitting Diode (LED). Modern LED lamps provide suitable lighting levels for a fraction of the energy consumption of traditional lamps.

In the event of a breakdown between floors, the lighting shall be maintained at normal level.

The lighting should be restored to the normal level as the result of:

- The elevator starting to move
- The doors opening
- A destination push button being operated; or any other push button on the operating panel being operated

Once the normal lighting has been dimmed/switched off, the elevator car must remain illuminated by a low energy luminaire providing a lumen output equivalent to that provided by an 8 W fluorescent lamp. This lighting could be provided by the emergency lighting unit required by BS EN 81-1/2.

Modern elevator s include automatic car light controls. Lights are on when the elevator is being used and switched off automatically when the elevator is idle. For existing elevators, if possible, retrofit automatic lighting controls. Lights shall be tested periodically, especially emergency maintained fittings to ensure that duration is met.

The elevator car shall also contain emergency maintained fittings to provide illumination should normal supplies fail. These must be checked at no less than monthly as part of the LSS check.

6.11.5 Machine Room Housekeeping Procedures

LMRs require larger volumes of air, greater number of air changes per hour to provide adequate cooling of the electronic drive and motor equipment. Air must be filtered, not to allow ingress of contaminants that could damage equipment. Temperatures shall be monitored locally and where possible by the building BMS system so that over temperature can be investigated.

Where the motor room is provided as a fire rated compartment for the elevator function then room integrity for fire is to be maintained. All penetrations are to be made good on completion. Machine rooms are to be kept sterile of all non-elevator related equipment/spares. Escape equipment and tools may be contained that are required for daily/periodic use. No other equipment oils/greases may be stored in these areas.

6.11.6 Hoisting System

Upon periodic inspection of the LMR, the hoisting system shall be monitored as this is the primary function of the plant and due to its constant use may deteriorate quickly if small defects are not addressed. Operation investigations shall include:

- Lubrication systems, where fitted, shall be operational
- Reservoirs to be maintained above minimum levels
- Check for signs of fraying cables or metal fragments on machinery
- Undue noise vibration or smells
- Safety equipment unimpeded and free to operate
- Shaft access plates in place to prevent falls

6.11.7 Escalators General Operations

Escalator systems shall undergo periodic inspection on a basis agreed by the Entity and imposed upon the MC. These can be a source of slips and trips if not used correctly by personnel and visitors. Therefore, the conditions shall be checked and reported. If there are any safety concerns, then they shall be isolated and put into use as walkways or closed dependent upon the nature of defect. Operational checks on the items are to include the following:

- Condition of steps or walkway (damaged flutes, uneven)
- Comb plate flutes undamaged
- Edge brush ways are intact and prevent access to side gaps
- Undue sounds or vibration
- Ride quality
- Belt damage or excessive buildup of dust at turns

In addition, escalators are also subject to statutory compliance requirements and shall be reported by the MC. They also require third party inspection on a periodic basis which shall be included with the maintenance activities. The contractor shall ensure that alternative routes are in place during maintenance activities that are safe for use. Reports on escalators shall also follow the same principles as elevators and be included within the reports provided to the client.

6.12 Safety

The facilities manager will formalize process to manage site safety during and while any maintenance activity takes place. Hazard and safety notices related to elevator systems are issued from the following main sources:

- Safety information bulletins and notices issued by facilities manager
- Notices from elevator manufacturer
- Safety notices issued by governing or advisory bodies
- Insurer or third party Inspections

It is the responsibility of the MC to inform the client of any notices, restrictions or policy change that may affect operations of the escalator or elevator systems. All received documentation is to be reviewed to ensure that it is applicable to the installation and take any remedial actions. Where necessary the requirements should be quoted at the earliest opportunity should the recommendation or requirement has a financial impact.

The MC is to adhere to safe working practices in place by the Entity and this shall include a PTW system requiring client/Entity approval.

The areas of risk identified in this guide are not exhaustive, and other standards may need to be consulted to ensure that the Entity facilities have compliant escalators and elevators. These have been selected since technological advancement can now significantly reduce the risk of injury. There is no order of priority and will vary according to circumstances. The objective is improved safety for all those who use and work on elevators.

6.12.1 Drawings and Records

All records of information, drawings and instructions will be registered by the facilities manager and will be maintained and updated by MC on each occasion that a change to the systems, plant or equipment is implemented.

When a new MC is appointed and takes over the maintenance of the equipment or within a reasonable time, they shall survey the site and provide an initial condition report to the RP.

The RP shall retain reports of the site condition made by the MC and thereafter when updated. The RP shall keep a record of maintenance activities for each item on site. To support the RP in this task the MC should provide him with a record of maintenance activity. It is a recommendation that a formal meeting (with formal minutes of meeting recorded) be held at six (6) monthly intervals to discuss maintenance activities, training, health & safety and financial aspects. Copies of minutes should be distributed to all attendees and stakeholders.

Wiring diagrams /technical information are essential for the safe investigation of faults and such diagrams are the property of the RP and not the maintenance company.

The RP shall keep a record of any inspections, thorough examinations, and any supplementary tests undertaken; and make these available to the MC. The RP shall report to the MC any tests or inspections of the electrical supply to the building. The reports shall contain details of the items inspected and/or maintained together with any recommendations and depending on the type of maintenance agreement shall identify items that were replaced or renewed or that require consideration clearly stating by when they should be completed.

If a critical safety problem is reported it shall be ensured that it has been received by those that require the report and in a position such that agreement can be confirmed on the actions to be taken.

6.12.2 Third Party Inspection

All elevators must be verified by third party to ensure it is safe before first use and periodically once it is in service to ensure it remains safe to use. Authorized third party must have valid accreditation for testing and inspecting the elevators. The inspection bodies shall be approved by local authorities to perform this activity.

Classification of inspection findings:

- Immediate action required to allow unit to remain in service
- Rectification within 1 x month for items that may require additional support spares
- Rectification not compulsory but as an advisory to be completed by the inspector

The MC will be required conduct the third party inspection of the elevators as per the prevailing standards in the region. The contractor is to include for the third party inspections of all elevators through a recognized inspection organization. These inspections are required to be carried out as per the prevailing laws in KSA.

Periodic inspection takes place every 6 months for passenger carry units, including those designated as goods where personnel may accompany. Annual for non-personnel units.

The third party authorized inspection body shall act according to relevant international standards including, but not limited to, EN 81-20 and EN 81-50.

The inspection body must have a management system, which includes, but not limited to, proper documentation of its policies, procedures and operations starting from receiving the request for an inspection, carrying out contract review, preparing for inspection, performing inspections, recording results,

and up to the issuance of the final report/certificate in accordance with the documentation requirements of ISO/ IEC 17020.

6.13 Escalator and Elevator Energy Efficiency

Elevators shall be installed to meet energy saving criteria, such as LEED, BREEAM. Their operation shall be considered as part of the facilities overall operating strategy. In particular, escalators shall have an auto start function enabled or reduced speed service. This can significantly reduce energy consumption, and wear, when not required.

Elevators can be placed into standby mode by their controllers after periods of inactivity. Cars can be parked at strategic positions, based upon historical traffic flow with doors open and lights dimmed. This reduces the necessity for installed fans and lighting to run at full speed. Once a passenger requests or enters the car then the car facilities will reinstate to normal usage without too much inconvenience.

A useful feature of modern elevator systems operating with variable frequency drives is regenerative power/braking. The technical aspects of this phenomenon are not detailed here but described so that facility operators and engineers can identify.

As an elevator descends with a large load, energy is not being drawn from the elevator system as the control of descent is under the operation of the counterweight. Therefore, this has the effect of providing power that can be input back into the facilities electrical system, which can assist with subsequent braking capacity as the car reaches its intended destination.

One disadvantage of this phenomenon if not monitored and contained within the design is that it can cause reverse power issues if the facility is operating on emergency standby generators with low load.

7.0 ATTACHMENTS

1. Attachment 1: EOM-ZO0-TP-000229 Elevator Start Up Checklist
2. Attachment 2: EOM-ZO0-TP-000230 Elevator Shut Down Checklist
3. Attachment 3: EOM-ZO0-TP-000237 Elevators & Escalators Systems Monitoring/Daily Rounds Checklist
4. Attachment 4: EOM-ZO0-TP-000238 Emergency Response Action Checklist Elevators & Escalators Systems.

Attachment 1: EOM-ZO0-TP-000229 Elevator Start- Up Checklist

		Reference No.	REV-001
Vol.5 Operations Management Chapter 12		Last updated	01.03.20

No.	Start-Up Procedure	CHECKED SATISFACTORY		
		N/A	YES	NO
	Elevators			
	Health and Safety			
1	Lighting / illumination is adequate			
2	Floor is free of oil /lubricant or I tripping hazard			
3	Required Personal Protective Equipment (PPE) available	☐	☐	☐
4	Risk Assessments Method Statement (RAMS) available	☐	☐	☐
5	Access to machine room is safe and well lit	☐	☐	☐
6	The specific safety practices and recommendations made by manufacturer of the elevator must be included and strictly adhered in Job Hazzard Analysis (JHA)	☐	☐	☐
7	Location of first aid instructions and supplies available	☐	☐	☐
8	Emergency evacuation plan reviewed	☐	☐	☐
9	Emergency contact details of the Responsible Person and the contractors	☐	☐	☐
10	HSE "Shared Shaft Working" RAMS reviewed and available	☐	☐	☐
11	Life Safety Systems (fire extinguishers, sprinklers, gas suppressors & fire-alarm) elevator motor room integrity	☐	☐	☐
12	Tool Box Talk Completed. Work tasks shall only be commenced when all the safety precautions are in place. The status of the works and the effectiveness of the safety precautions shall be Closely monitored and regularly reviewed.	☐	☐	☐
	Pre-approvals			
13	System owner/Manager/Engineering team's approvals available	☐	☐	☐
14	End-user/Department Head's approval available	☐	☐	☐
15	Quality, Health. Safety, Environment Management (QHSE) approval available	☐	☐	☐
16	Maintenance contractor's schedule of work	☐	☐	☐
17	Pre-startup testing certificates FMC engineer approved and available	☐	☐	☐
18	Approved Permit To Work (PTW)	☐	☐	☐
	System Readiness			
19	Telephone for Emergency call	☐	☐	☐
21	Emergency Light	☐	☐	☐
22	Telephone Numbers to contact during emergency	☐	☐	☐
23	Certificate provided by Elevator Inspector /factory Inspector	☐	☐	☐
24	Carrying capacity in KGs / No. of Passenger	☐	☐	☐
25	Required tools checks	☐	☐	☐
26	Lock Off Tags Out (LOTO) all FMC and Specialist contractor locks and devises removed	☐	☐	☐
27	Confirm with schematic and Business Management system (BMS)	☐	☐	☐
28	Areas are cleaned and egress checks	☐	☐	☐
	Pre-Start Checks			
29	System fault free/alarm free check	☐	☐	☐
30	Original Equipment Manufacturers' (OEM) startup procedure available	☐	☐	☐
31	Barriers/covers are provided to prevent accidents	☐	☐	☐
32	All moving equipment, machinery and rotating parts are guarded	☐	☐	☐
	Start Checks			
33	Safe Means of hoisting (Capacity, Hook Locking) is available	☐	☐	☐

Attachment 2: EOM-ZO0-TP-000230 Elevator Shutdown Checklist

Building NAME:		Reference No.	REV-001	
Vol. 5 Operations Management Chapter 12		Last updated	01.03.20	
No.	Shutdown Procedure	CHECKED SATISFACTORY		
		N/A	YES	NO
	Elevators			
	Health and Safety			
1	Lighting / illumination is adequate	☐	☐	☐
2	Floor is free of oil /lubricant or I tripping hazard	☐	☐	☐
3	Required Personal Protective Equipment (PPE) available	☐	☐	☐
4	Risk Assessments Method Statement (RAMS) available	☐	☐	☐
5	Access to machine room is safe and well lit	☐	☐	☐
6	The specific safety practices and recommendations made by manufacturer of the elevator must be included and strictly adhered in Job Hazzard Analysis (JHA)	☐	☐	☐
7	Location of first aid instructions and supplies available	☐	☐	☐
8	Emergency evacuation plan reviewed	☐	☐	☐
9	Emergency contact details of the Responsible Person and the contractors	☐	☐	☐
	HSE "Shared Shaft Working" RAMS reviewed and available	☐	☐	☐
10	Life Safety Systems (fire extinguishers, sprinklers, gas suppressors & fire-alarm) Elevator motor room integrity	☐	☐	☐
11	Tool Box Talk Completed. Work tasks shall only be commenced when all the safety precautions are in place. The status of the works and the effectiveness of the safety precautions shall be Closely monitored and regularly reviewed.	☐	☐	☐
	Pre-approvals			
10	System Owner/ Manager /Engineering team's approvals available	☐	☐	☐
11	End-user/ Department head's approvals available	☐	☐	☐
12	Quality, Health, Safety and Environment Management (QHSE) approvals available	☐	☐	☐
13	Specialist contractor's schedule of work	☐	☐	☐
15	Approved Permit To Work (PTW)	☐	☐	☐
	Pre-Shutdown and System / Asset Condition Checks			
16	Final stakeholder/Fire command center, checks and approvals pre-shutdown	☐	☐	☐
17	System / Asset numbers cross check with PTW	☐	☐	☐
18	System / Asset condition and PM / UM report available	☐	☐	☐
19	Shared Shaft Working process in place	☐	☐	☐
	Elevator Landing props / anti drop clamps in place	☐	☐	☐
	Shut-down checks			
	Fire Command Center status checks	☐	☐	☐
	Business Management System (BMS) Status check	☐	☐	☐
	Elevator "out of service notices" in place	☐	☐	☐
	Lock out, Tag Out (LOTO) FMC and Specialist contractor locks applied as required	☐	☐	☐
	PTW / LOTO under specialist contractor control	☐	☐	☐

Attachment 3: EOM-ZO0-TP-000237- Escalators and Elevators Systems Monitoring/Daily Rounds Checklist

Facility Name:		Reference No.	REV-000	
No.	Systems Monitoring/Daily Rounds Checklist	CHECKED SATISFACTORY		
		N/A	YES	NO
	Elevators & Escalators – Facility	☐	☐	☐
	This monitoring checklist is intended to highlight key issues that may arise day to day at local level. The procedures and any supporting information should be reviewed and amended as necessary to ensure that the document remains up-to-date and definitive for the facility.	☐	☐	☐
1	System inspection and checking: is the elevators are running	☐	☐	☐
2	System assessment checks: Is the elevator and its associated plant machine room secured from unauthorized access	☐	☐	☐
3	Remote monitoring of elevator systems and equipment checks Business Management System (BMS)	☐	☐	☐
4	Identifying maintenance risks on equipment and raising work orders	☐	☐	☐
5	Investigating fault /alarms for elevator systems checks	☐	☐	☐
6	Cleaning, adjustment of system, inspection of car lighting	☐	☐	☐
7	Performing prompt emergency repairs and post efficiency checks	☐	☐	☐
8	Providing technical directions to ensure system is maintained returned to service	☐	☐	☐
9	Keeping daily logs and records of all the maintenance functions	☐	☐	☐
10	Ensuring compliance with applicable standards and with occupational health & safety checks	☐	☐	☐
11	Complying with service standards, work instructions and users' requirements	☐	☐	☐
12	IF ANY PART OF THE ELEVATOR IS FOUND TO BE MALFUNCTIONING, such as lighting, ventilation, levelling, controls, or if the elevator exhibits abnormal motion, it must be reported immediately to the Facility Management team responsible for operation of the building.	☐	☐	☐

No.	Reviewer's Comments	Resolution
Originator's Name/Signature and Date:		Checker's Name/Signature and Date:

Attachment 4: EOM-ZO0-TP-000238- Emergency Response Action Checklist Escalators and Elevators Systems.

Facility Name:		Reference No.	REV-000	
No.	**Emergency Response Action Rounds Checklist**	**CHECKED SATISFACTORY**		
		N/A	YES	NO
	Escalators & Elevators – Facility			
	The Escalator/Elevator Maintenance Contractor (MC) should provide you with a 24-hour per day, 365 days per year service to respond to entrapments, breakdowns and to carry out unscheduled corrective maintenance. Your rescue service must be trained to help to resolve difficulties and to take the right action for almost all eventualities for vertical transportation systems.			
	Entrapments Protocol			
1	Unless the Elevator is at a floor with its doors open it can be difficult to determine if a passenger is still in a car that has stopped. They may be ill and unable to talk. If you cannot see inside the car at a floor you should assume there is a person in it and therefore call for assistance.	☐	☐	☐
2	Are the key switches in the elevator set for normal operation	☐	☐	☐
3	Have any push buttons become jammed/stuck	☐	☐	☐
4	Are the elevator car and/or landing doors unobstructed and clear to run	☐	☐	☐
5	Is any door detector or the safety edge clean and free to work	☐	☐	☐
6	Are the main switches for electrical power to the system switched on	☐	☐	☐
7	Has the elevator been overloaded	☐	☐	☐
8	Do not try to force to open the elevator door	☐	☐	☐
9	Only trained or competent persons must carry out rescue procedures	☐	☐	☐
10	If the elevator car cannot be moved, you must immediately notify the emergency service of the elevator Maintenance Contractor (MC)	☐	☐	☐
	Note: The use of the landing door emergency unlocking key must be strictly limited to trained / competent persons for safety reasons.	☐	☐	☐

No.	Reviewer's Comments	Resolution
Originator's Name / Signature and Date:		Checker's Name / Signature and Date: