International Labour Organization

Better Work Jordan Programme

Enhancing the Structural Integrity of Dormitory Buildings in Jordan's Garment Sector - Phase II

Guidance for Assessment and Repair of Typical Defects Report

September 2021

engicon

Table of Contents

List of Figures

List of Tables

1. Executive Summary

The "Guidance for Assessment and Repair of Typical Defects Report" is the second task assigned to Engicon, under Phase II of Better Work Jordan's (BWJ) project "Enhancing the Structural Integrity of Dormitory Buildings in Jordan's Garment Sector".

Stemming from the outcomes of task 1 "Typical Defects Identification Report" related to the living conditions of workers (structural integrity of dormitories), which were proved to be directly proportional to business benefits, and abiding to one of the project aims, which is to set guidelines related to assessing and mitigating defects against certain health and safety measures within dormitories; this report helps non-technical members identify typical defects along with their accompanied risks to the health and safety of workers, and set a plan for corrective actions and repair works needed, classified under 4 main Occupational Safety and Health (OSH) related measures: Structural Integrity, Electrical Safety, Fire Safety, and Public Health, and following certain requirements of related local and international codes and standards.

Descending from filling inspection checklists (provided in task one report) and categorizing identified defects with reference to severity of accompanied risks to the health and safety of worker living in the dorms under 5 main categories (Insufficient, Minor, Moderate, Major, Fatal); inspectors of different backgrounds can use the guidelines presented in this report to highlight repair works needed for each identified typical defect, and document corrective actions needed in an efficient and effective way for executives to handle, in order to set priorities to the corrective actions needed, and prepare an implementation plan with relevance to budgets and severity of accompanied risks.

It should be noted that the repair works and recommendations included in this report are based on experience of our technical team (Engineers) in Engicon, yet further investigation is needed by professionals, craftsmen, or contractors to support decisions related to the suggested improvements, or to suggest further repair works wherever found needed, with relevance to their own inspection of the existing conditions of dorms, in order to define costs related to the implementation of the corrective actions.

2. Abbreviations

2.1. List of General Abbreviations and Acronyms

BWJ	Better Work Jordan Programme
EHS	Environmental Health and Safety
GoJ	Government of Jordan
HR	Human Resources
IEQ	Indoor Environment Quality
ILO	International Labour Organization
JEA	Jordan Engineers Association
MoH	Ministry of Health
MoL	Ministry of Labour
MoPWH	Ministry of Public Works and Housing
OSH	Occupational Safety and Health

2.2. List of Technical Abbreviations and Acronyms

AC	Air Conditioning
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BS	British Standards
CCTV	Closed-circuit television
DB	Electrical Distribution Board
FACP	Fire Alarm Control Panel
FFL	Finish Floor Level
FR	Fire Rated
HVAC	Heating, ventilation, and air conditioning
IBC	International Building Code
ICC	International Code Council, Inc
ID	Interior Design
IRS	Internal Responsibility System
JBC	Jordanian Building Code
LPG	Liquefied petroleum gas
MEP	Mechanical, Electrical and Plumbing
NFPA	National Fire Protection Association
RCD	Residual Current Device
UBC	Uniform Building Code
WC	Water Closet

3. Introduction

The Better Work Jordan Programme (BWJ) brings together stakeholders from all levels of Jordan's garment manufacturing industry to improve working conditions, enhance respect for labour rights, and boost the competitiveness of the sector.

Factories participating in BWJ are monitored and advised through factory assessments, advisory visits, and training services.

The programme aims at improving the provision of safer working conditions, especially around occupational safety, and health across manufacturing enterprises across Jordan.

A key object of this programme is to demonstrate that good working conditions and decent technical investment can help make factories and their satellite units become more productive.

From all the above descended the project "Enhancing the Structural Integrity of Dormitory Buildings in Jordan's Garment Sector".

3.1. Assigned Tasks

Engicon was assigned to complete four main tasks related to the "Enhancing the Structural Integrity of Dormitory Buildings in Jordan's Garment Sector" Project:

1. Prepare a Typical Defects Identification Report.
2. Provide guidance for assessment and repair of typical defects report.

   (Which this report represents)
3. Set a methodology for identification of other non-typical defects.
4. Suggest standards to be used for rectification of defects in existing dormitory buildings and design of new dormitory buildings.

3.2. Project Main Objectives

The project aims at achieving the following four main objectives:

- Awareness raising among factory owners on typical building safety requirements.
- Guidance to identify safety defects and the level of expertise needed for rectification.
- Identification of national codes requirements for dormitories.
- Identification of safety issues not covered by national codes, with reference to international good practices.

4. References

This report represents the second task titled "Guidance for assessment for repair of typical defects report". So, in order to prepare this report, Engicon team poured their experience and investigated variable standards and codes related to the assigned task, to highlight typical defects identified in task one and illustrate the accompanied risks of each defect and develop a guideline (in a form of a table) suggesting repair works, improvements, corrective actions with relevance to the classification of the identified typical defects in dormitories, relating to the severity of accompanied risks against certain occupational safety and health measures. (*)

4.1. OSH Related Documents and Procedures

Comprehensive guide - MoL - Work procedures for safety and health prevention measures to limit the spread of the corona virus
Dormitories Inspection/Assessment Guide (Jordanian MoL, MoH, BWJ)
The Public Health Law

4.2. National and International Technical Codes and Standards

National Fire Protection Association (NFPA)
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Jordanian National Building Codes
British Standards
American Standards
2015 International Building Code® (IBC), by the International Code Council, Inc (ICC)

(*) For illustrations related to references, Local and International Codes and Standards used, check Annex A (List of References) attached to this report.

5. The Suggested Strategic Plan to Assess and Enhance OSH Conditions in Dormitories

In order to ensure continuous improvement to the OSH managements system and ensure appropriate living conditions are provided to workers within dormitories, the following strategic plan is suggested, and procedures are recommended to be followed as illustrated in the following figure.

Figure 5-1:The Suggested Strategic Plan to Continuous Improvement (OSH Management System)

6. Assessment Methodology

6.1. Assessment Measures

With reference to local and international codes and standards related to the OSH in dormitories, the following basic measures were taken to assess conditions of dorms:

- Structural Integrity
- Electrical Safety
- Fire Safety
- Public Health

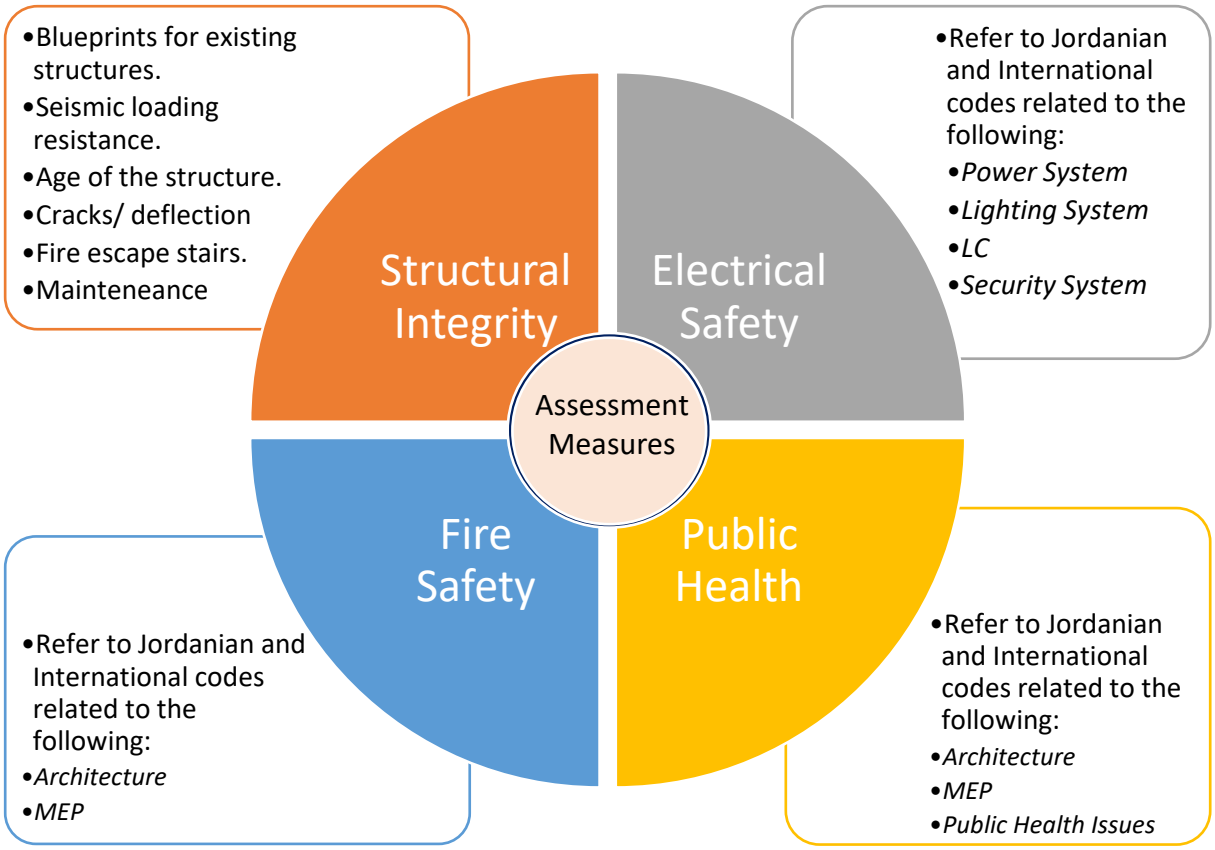


Figure 6-1: Assessment Measures Related to OHS in Dormitories

7. Applications

As a general procedure suggested for the assessment of dormitory buildings; thorough visual inspection against certain measures (structural integrity, fire and electrical safety and public health) should be conducted internally, by a competent person, on regular basis, and the identified weaknesses and hazards should be reported and addressed duly by the administration of the company. Certain defects might need the interference of an expert, professional, contractor or engineer to reassess and mitigate the situation with reference to the defect's classification related to the severity of its accompanied risks.

So, as part of task one, and in order to facilitate the job of assessing the dormitory conditions against the previously identified four measures, Engicon proposed an **Inspection Checklist** to be filled for each dorm upon visit, to define typical defects with reference to standards, and give guidance to the classification of the defect into five suggested categories (Insignificant, Minor, Moderate, Major and Fatal) with reference to the severity of accompanied risks jeopardising safety and health of workers living in the subjected dormitory buildings.

Note

Refer to the first report "Typical Defects identification Report" to find the detailed inspection checklist suggested, and understand the assessment methodology to identify typical defects.

And, as for (task two) guidance to assessing and repairing typical defect, technical data and measurements are quoted from local and international codes, **standards are highlighted** and reference **images and figures are shown**, **to help non-technical members assess** the structural integrity of their dormitory buildings and **identify noncompliance** with reference to the illustrated minimum OSH requirements and **understand the severity of potential risks** accompanied with the identified typical defects and **raise awareness towards corrective actions needed**.

Before any assessment, obtaining all relevant licenses from the competent authorities as per the relevant laws and regulations for any dormitory building is mandatory. All blueprints, as built drawings, stamped copies for the original design drawings are to be available and matching with the current situation of the building. Accordingly, any observed additional floors and/or annexes are considered a serious violation and may have serious safety and health consequences, therefore new approvals and licenses for the new expansion should be taken from competent authorities (Municipalities, Jordan engineering associations and Department of Civil Defence).

7.1. Illustrations

Deriving from task one, the gathered inspection data (from the assessment conducted by Engicon for variable existing dormitory buildings) was studied and analysed to come up with the following set of typical defects identified with Moderate, Major or Fatal categorization of accompanied risks, affecting the safety and health of inhabitants. And some illustrations are used here below, to make it easier for the inspector to identify these defects:

7.1.1. Related to Structural Integrity:

7.1.1.1. Poor Insulation of Roof Slab:

Insulation on roof is vital, since water not only risks the structural elements of the building but also anything underneath or within it, including people and networks.

Water will penetrate through the concrete surface and cause corrosion of reinforcing bars and spalling of concrete by increasing cracks, which will finally lead to failure and collapse of the element. *(RII*)*

Figure 7-1: Good vs. Poor Insulation of Roof Slab

(*) *R#:* represents the reference number to the code name or standard shown in Annex A of this report, from which minimum requirements related to OSH measures were derived.

7.1.1.2. Spalling in Concrete Cover and Plastering:

A lot of spalling in concrete cover and plastering was noticed, yet it should be noted that spalling in general is caused by many reasons, low concrete cover during the construction, high loads and deflection, and high humidity levels or water leakage (due to other defects such as faults in the mechanical systems or poor ventilation).

Spalling of concrete will reduce the capacity of the element to support the imposed loads and will cause reinforcing bars corrosion, which will finally lead to failure and collapse of the element. *(R4 and R5)*

Figure 7-2: Corrosion of steel due to concrete spalling

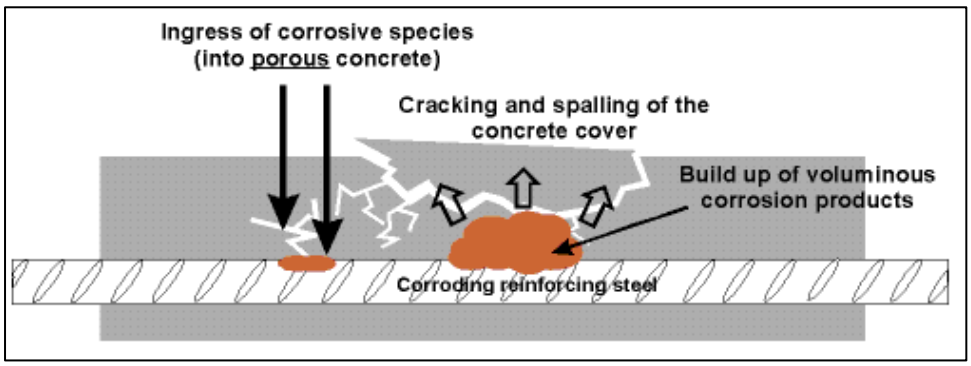


Figure 7-3: Spalling jeopardizing steel structure

7.1.1.3. Water Leakage in Slabs or Walls:

A slight leakage problem in water networks can cause major damages to the supporting structural elements of the building, meaning if water leakage was noticed, no disregard should be made, and the situation should be solved.

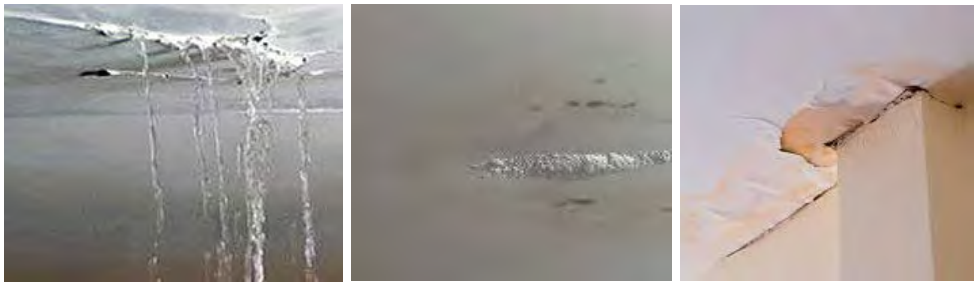


Figure 7-4: Common leakage problems

7.1.1.4. Roof Slab Overloading, additions or change in use or function of space:

It should be noted that even if the structure looks solid, made of steel or reinforced concrete, building structures are designed with reference to calculation of potential live and dead loads, so any additional load on slabs or roofs, will compromise the integrity and stability of the structure, and as a result endanger lives of worker living under these roofs. *(R3 and R8)*

Figure 7-5: Overloading of roof slabs and failure possibility

This defect can be accurately assessed with reference to the as built drawings and original design load calculations, if provided or available.

7.1.2. Related to Electrical Safety:

7.1.2.1. Lack of emergency lighting/ Exits signs in poor condition:

Emergency lights are highly important to guide the occupants out of the building through the whole emergency route. If distribution of the emergency lights does not comply with the codes or if fixtures are damaged or in poor conditions, workers lives will be endangered since they might get lost or trapped in the building at times of hazards. *(R18,R19 and R21)*

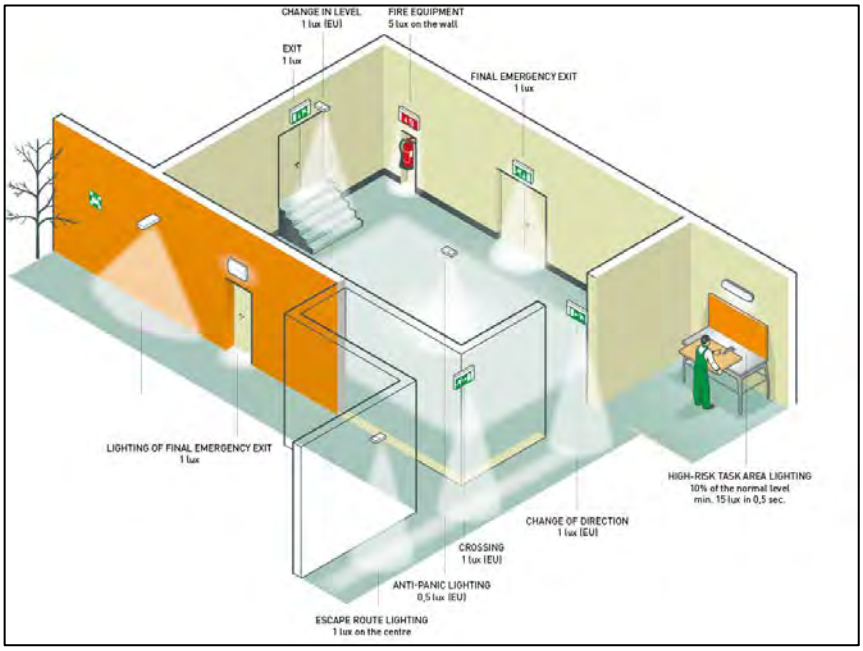


Figure 7-6: Proper Emergency Lighting Distribution

7.1.2.2. Lighting fittings, fixtures and ceiling fans are improperly installed/in bad working condition:

A ceiling fan that breaks free from its ceiling mount can be deadly, so fans must be supported by an electrical junction box listed for that use according to the National Electric Code, and a fan brace box will need to be installed. While a particular junction box might support a fully assembled fan; during operation, it will exert additional forces (notably, torsion) that can cause the support to fail.

The same is for lighting fixtures too, the hazard of improperly installed fixtures could cause lighting fixtures to fall and affect workers' safety. *(R11)*

7.1.2.3. Earthing system missing or in bad condition:

Earthing is an essential component of electrical systems; because it keeps people safe by preventing electric shocks and prevents damage to electrical appliances and devices by preventing excessive current from running through the circuit. *(R9 and R10)*

Also, it prevents the risk of fire that could be caused by the leakage current.

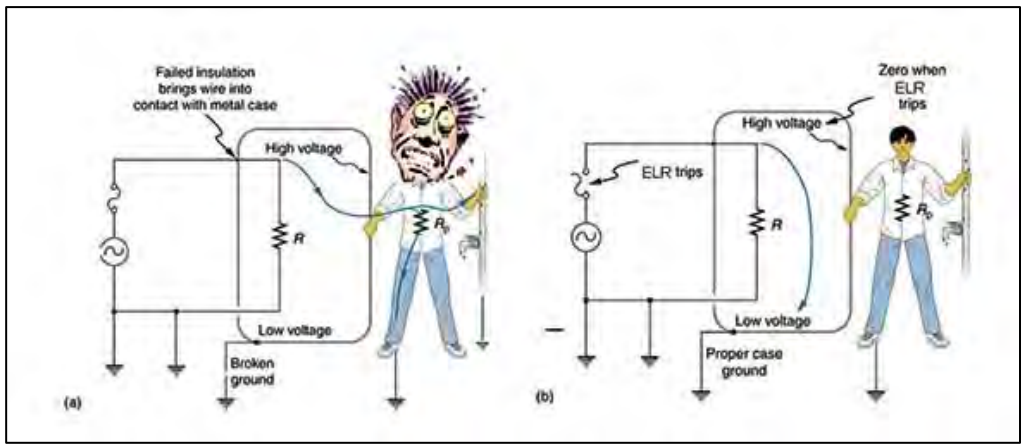
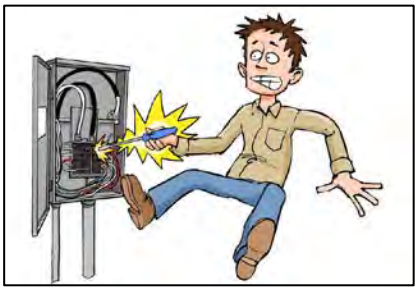


Figure 7-7: Proper vs. Broken Grounding

7.1.2.4. Unsafe connection to DB and boards are Exposed, Electrical boards /not controlled/ subject to vandalism:



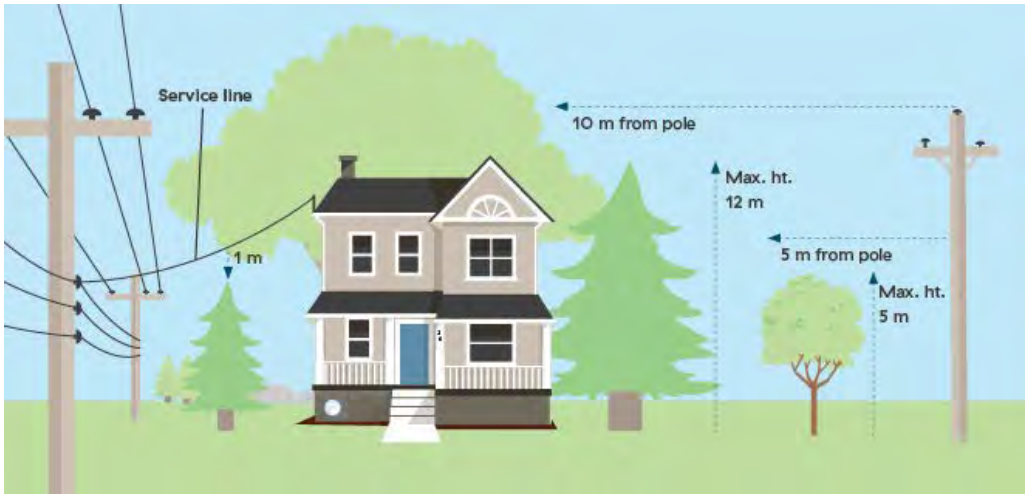
Exposed electrical connections to DB could cause fire by arc fault energy developed as a result of a short circuit fault also, they may cause injury due to electrical shock, or electrocution and poses the risk of contact with live wires. *(R11, R12 and R13)*

7.1.2.5. Waterproof outlets in poor condition or missing within kitchens, wet areas, or outdoors:

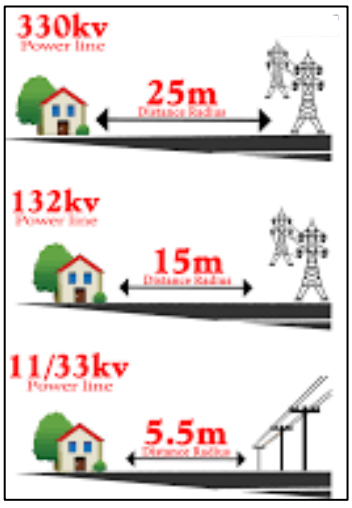
Using electrical products that are not designed to be waterproof in wet areas can destroy these outlets or create an electric shock hazard due to exposure to water or condensation which causes reduced body resistance and better electrical contact. *(R11, R12 and R13)*

7.1.2.6. Power supply columns or cables located too close to workers:

Electrical Power supplies columns or cables close to workers affect the safety of the workers; they may cause injury due to electrical shock, fire, or electrocution. Also, poses the risk of contact with live wires. (See the figures below showing the minimum distances between building and wires and poles) *(R11, R12 and R13)*



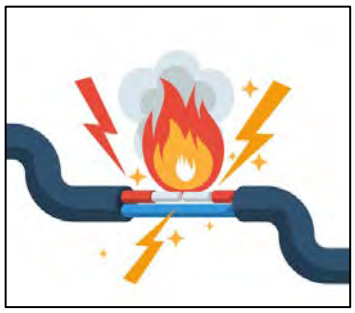
Employers and workers should be aware of the dangers of working near or underneath overhead power lines. Electricity can flash over from them, even though machinery or equipment may not touch them.



MINIMUM SAFE DISTANCES BETWEEN BUILDINGS AND OVERHEAD ELECTRIC LINE SUPPORT STRUCTURES

Circuit Voltage	Pole	Tower (pylon)
11 kV to 33 kV	2 m	6 m
Exceeding 33 kV to 66 kV	6 m	9 m
Exceeding 66 kV	8 m	12 m

7.1.2.7. Exposed wires /Missing covers for sockets or outlets:



Exposed electrical connections affect the safety of the workers; they may cause injury due to electrical shock, fire, or electrocution. Also, using an open front plug poses the risk of contact with live wires when plugging it into an electrical outlet. *(R11, R12 and R13)*

7.1.2.8. Electrical Overloading:

Electric circuit overloads are a significant cause of fires, so it's crucial to be alert to the warning signs and know how to manage power consumption.

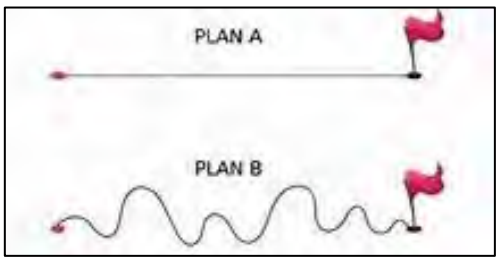
Exceeding the rated load for the circuit wiring will trip the breaker, closing down the entire circuit. Without a breaker, an overload would overheat the circuit wiring, which could melt the insulation and spark a fire. *(R11, R12 and R13)*

7.1.3. Related to Fire Safety:

7.1.3.1. Emergency exit routes being obstructed with clutter, personal belongings or shoes of workers and scattered furniture:

If the emergency exit routes are obstructed or unclear, this will make it harder for people to reach exits. *(R16)*

The figure to the right illustrates the difference between the length/ distance travelled in a clear secured path (Plan A), and a path not properly insulated or obstructed (Plan B).



7.1.3.2. Inadequate distribution of Hose Reel Cabinets:

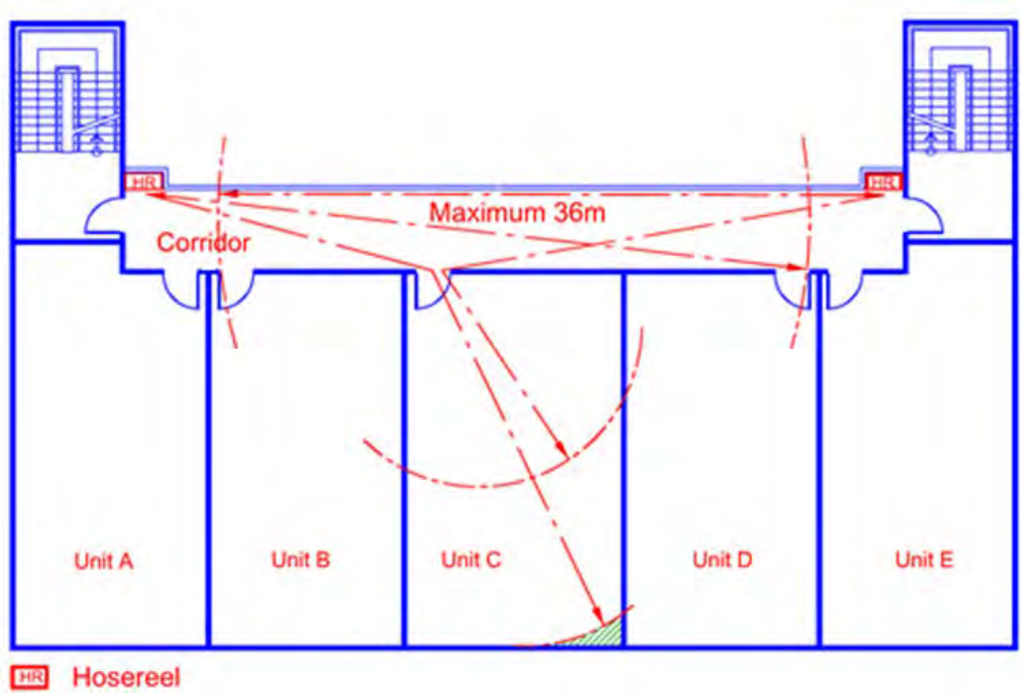


Figure 7-8: Proper Distribution of Hose Reel Cabinets

Inadequate distribution of the hose reel cabinets will result in the hose reel not reaching all areas, which may lead to people not being able to escape the building, especially if the fire has spread to the exit routes. *(R20, R21 and R22)*

The maximum area covered by one hose shall be limited to the type of hazard as shown in the Table below: *(R20)*

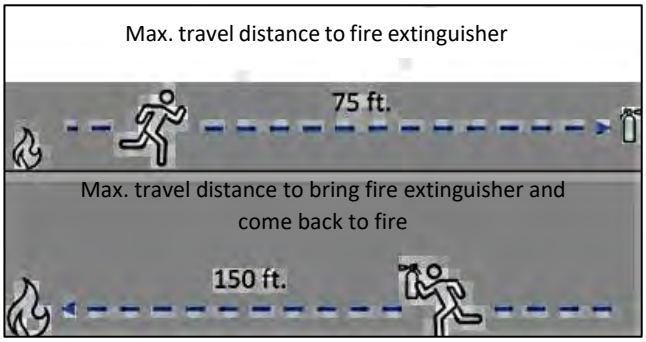
Table 1: Maximum Area covered vs. Type of Hazards

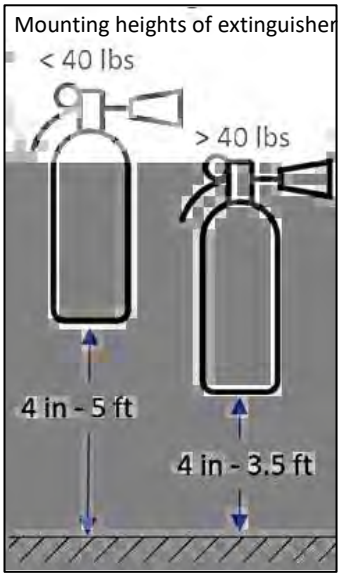
Type of hazard	Area (sq.m.)	Hose Diam. (mm)
Light	800	19 or 25
Ordinary	600	19 or 25
Extra	400	40

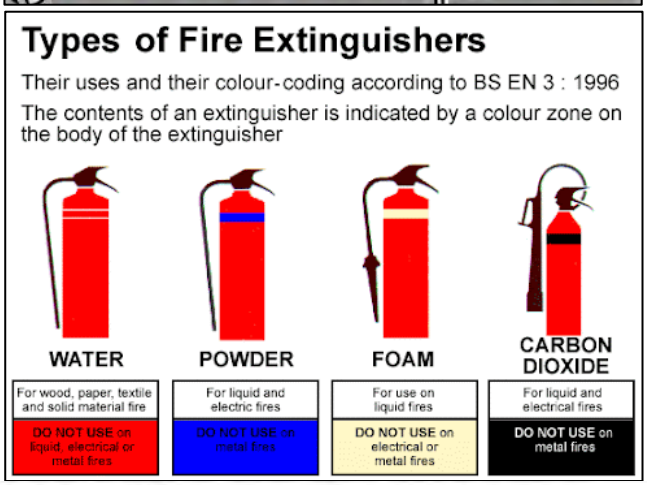
7.1.3.3. Mechanical closets are subject to vandalism:

Vandalized hose reel cabinets may lead to inadequate flow and pressure in the hose reel, which will result in inefficient or slow fire extinguishing. *(R27, R28 and R30)*

7.1.3.4. Inadequate distribution of portable fire extinguishers:







Extinguisher Class	Max Travel Distance	NFPA 10 Section (2018 ed.)	Notes
Ordinary Combustibles	75 ft	Table 6.2.1.1	Travel distance can be altered by the type of hazard anticipated and the numerical A rating of the extinguisher.
Flammable Liquids	30 ft or 50 ft	Table 6.3.1.1	Travel distance is based on the type of hazard anticipated and the numerical B rating of the extinguisher. See table 6.3.1.1 below.
Electrical Equipment	N/A	6.4.3	Since extinguishers are never only Class C rated you need to follow the Class A or Class B rating requirements.
Combustible Metals	75 ft	6.5.2	
	30 ft	6.6.2	Class K: Cooking Media

Inadequate distribution of fire extinguishers (or lack of directional signs related to the location of extinguishers) makes them inaccessible during fires. Fire extinguishers shall be located along normal paths of travel, including exits.

Also, the wrong choice of fire extinguisher type will lead to incorrect use of them, which may lead to fire spreading or damage to some equipment. (Check the above figures for illustrations)

Portable fire extinguisher type, number and size is dependent on the type of potential fire with relevance to the room function and capacity. The minimal sizes of fire extinguishers for the listed grades of hazards shall be provided on the basis of the following table:

Table 2: Minimal Sizes Selection of Fire Extinguishers with relevance to Grade of Hazard

Criteria	Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
Minimum rated single extinguisher	(2-A)	(2-A)	(4-A)
Maximum floor area per unit of A (m2)	280	140	90

Co2 fire extinguishers must be used in electrical rooms. While, ceiling hung powder extinguisher above the burner must be used in the boiler room.

(R20, R21 and R22)

Dormitories mainly need an automatic fire detection and warning system distributed at corridors, staircases, kitchenette, electrical and mechanical rooms and other utilities with a control panel which can identify the zone or the specific location where the alarm has been raised. The control panel (or a repeat panel) should be located near the entrance or where there is 24-hour vigilance.

7.1.3.5. Assembly area inadequate or in poor condition:

In case of fire or emergency, occupants are supposed to have clear guidance towards a safe assembly area (at the end of the exit route), mostly outdoors, close to the outer borders of the facility/dorm.

The assembly areas are supposed to be of a sufficient area to accommodate all inhabitants, and free of clutter or obstacles (should be empty, clean, safe and ready at all times, and not improperly used for throwing junk or broken furniture…etc.) *(R16)*

An alternative location should be identified, and the allocated areas must be at least 15m away from the building in case the fire causes the building to collapse.

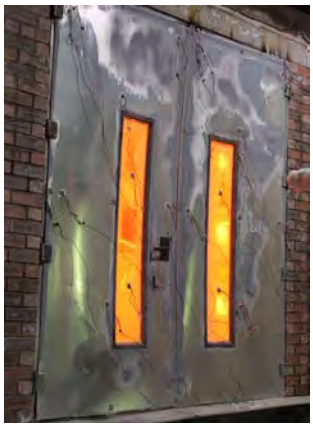
7.1.3.6. No easy access provided for emergency vehicles:

It should be noted that different areas of the building in cases of emergencies or fire should be easily accessed and reached by ambulances and fire engines. Minimum width of road leading to the premises is 9m. *(R16)*

(See the following figure)

Figure 7-9: Access for Emergency Vehicles (Ambulance and Fire Engine)

7.1.3.7. Vertical shafts or storages not provided with fire rated doors as per national code requirements:



Fire-rated doors reduce the risk of fire spreading throughout a building. That's why they should be sealed and properly fixed and fully operational (meaning all hardware sets and self-closing mechanisms are to be installed and in good working condition) *(R16)*

All fire rated doors should be installed where needed and are supposed to be stamped by the supplier to identify fire rating characteristics.

7.1.3.8. Doors along emergency exit routes and hardware sets in poor condition (doors or hardware are broken, not properly fixed or insufficiently sealed) (self-closing mechanism is missing) (noncompliance to codes):

All doors along the emergency exit paths should be easily openable in the direction of travel. It is particularly important to note the mechanisms provided at the final Exit doors, which normally have to be lockable from outside for security reasons, but they still need to be side swing doors capable of being opened from the inside, without the use of a key, for means of escape. When locked from the outside, the mechanism for opening the door from inside should override the lock. *(R16)*

7.1.3.9. Emergency exit routes being insufficiently secured or insulated (including corridors and staircase leading to emergency exits):

If emergency routes weren't secured and well insulated, occupants won't be able to reach exits safely or fast enough. *(R16)*

Vertical escape to ground level from upper floors is normally via open or protected stairways. When a stairway communicates more than two floors then they need to be separated from the adjacent areas with fire rated construction.

Staircases should be protected with fire rated enclosures and doors at openings leading to these enclosures, and shall also be provided with self-closing devices to ensure that doors close automatically after use.

Escape stairs should be protected all the way to where they discharge to outside at ground level.

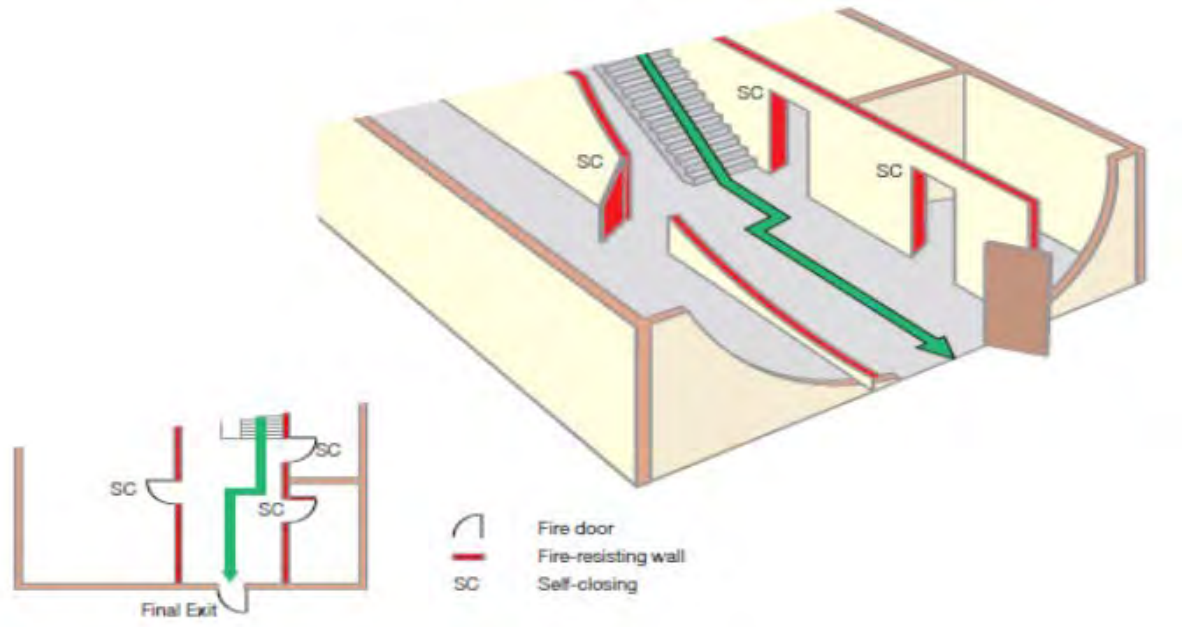
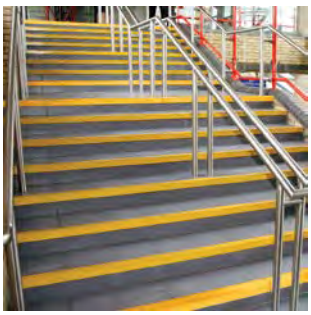


Figure 7-10: Protection of Staircases Enclosures

External escape staircases are also permitted if they lead directly to the ground, and are separated from the building interior by fire resistive assemblies or walls and are constructed of non-combustible materials.

External stairs need to be provided with a level of fire protection to prevent flames and smoke spreading via the façade of the building and affecting people using the stairs for escaping.

7.1.3.10. Inadequate dimensions or finishes of stairs (slippery steps/ cracked edges/ handrails are missing or in poor condition):



Stairs should be safe, provided with non-slippery edging or finishes and guarded by handrails of sufficient heights (min 75cm h. from FFL) (wherever needed) to prevent tripping, slipping or falling accidents from happening.

Stairsteps are to be of appropriate dimensions (≥1.1m wide tread), protected against fire and smoke specially if considered as part of escape routes.

(RI and R16)

In General, the below priliminary checklist showed be followed for fire safety:

Figure 7-11: Basic Checklist for Fire Safety

7.1.4. Related to Mechanical Systems:

7.1.4.1. Lack of provision of domestic water supply (potable water for drinking and washing), or in poor condition:

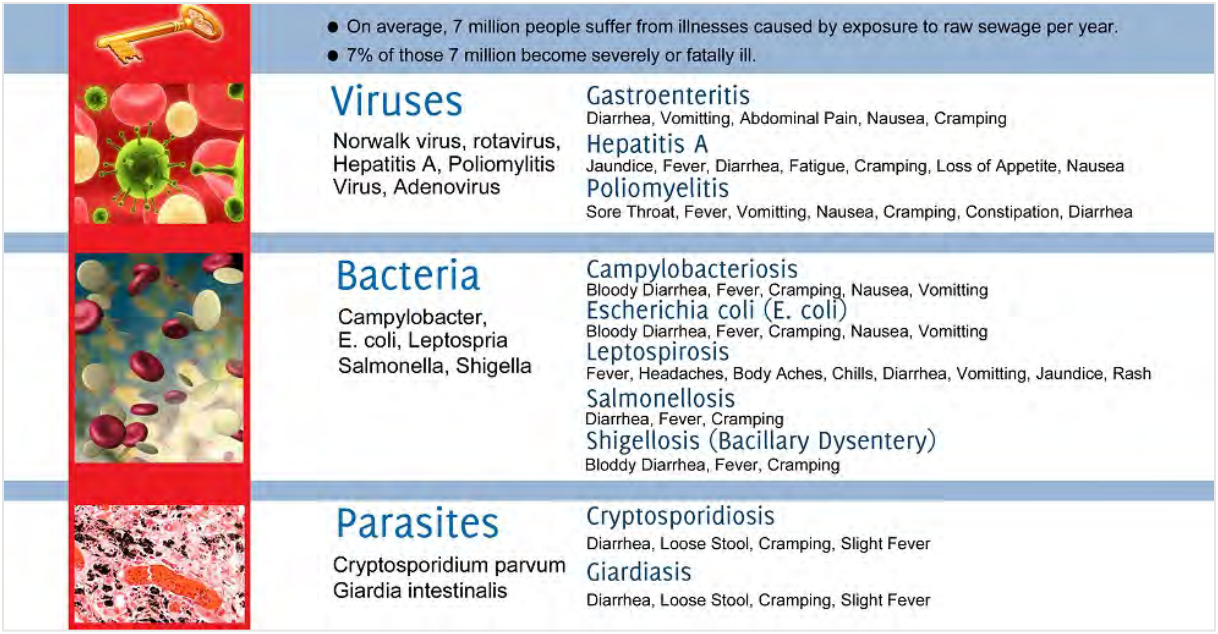
Domestic water supply system in poor condition can cause many problems, for example:

- leaking water pipes may cause a fire if water reaches the electrical supply or loose wires, and it can cause serious structural damage to the building.
- Unmaintained or exposed water tanks may lead to pollution in the water, which will cause diseases.

(R27)

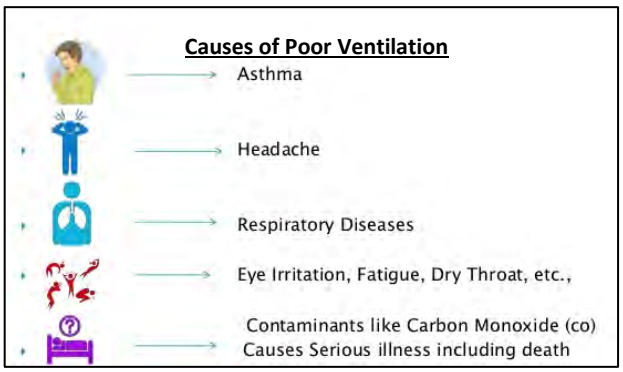
7.1.4.2. Poor Sanitary Drainage (Occlusion of internal sewage network)

Occlusion of the internal sewage network will result in the overflow of sewage inside the building, which may result in people slipping and diseases, from which some are listed below. *(R27)*



7.1.4.3. Poor ventilation (Insufficient ventilation in bathrooms and bedrooms):

Poor ventilation results in poor extraction of smoke from cooking and bad odours, which will result in mould build-up in the building, low oxygen levels, and respiratory system diseases.



Sufficient exposure to natural air ventilation through window openings is needed to help reach acceptable levels of ventilation. (Wherever natural air is not provided yet insufficient ventilation is identified, mechanical solutions should be studied with experts to reach comfortable measures) *(R30)*

7.1.4.4. Lack of central heating/ AC, or in bad condition:

The lack of a heating system will result in low temperature-related illnesses such as hypothermia. *(R28)*

7.1.4.5. Inadequate temperature and humidity levels within different spaces:

High humidity levels will result in the build-up of black mould inside the building, which may lead to some health issues, such as chronic coughing and sneezing, and irritation to the eyes.

The relative humidity of any occupied space shall be designed to be limited to 65% or less, and for thermal comfort purposes, temperature could range between approximately 67 and 82 °F (19 and 27) °C . *(R28)*

7.1.4.6. Malfunctioning or missing LPG System (Noncompliance with Safety Requirements/ Lack of gas leakage detectors/ Location away from highly occupied areas):

Noncompliance with the safety requirements *(R29)* and the lack of gas leak detectors can cause many problems, for example:

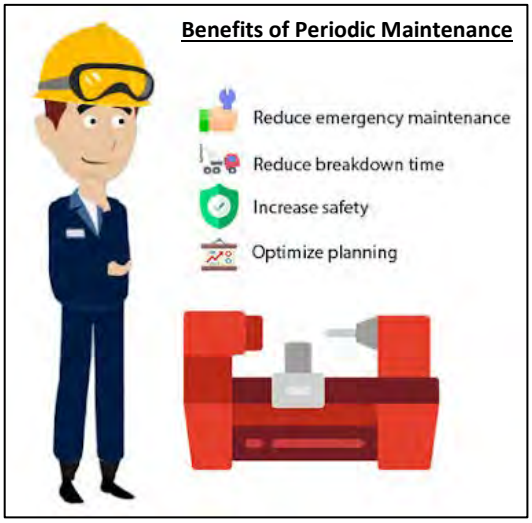
- If there is a leak in the LPG system and it goes undetected, it will cause suffocation or a fire.
- If the LPG system is in highly occupied areas or near exit routes, it may be difficult to escape these areas in case of fire.

7.1.4.7. Poor rainwater drain system:

Poor rainwater drain system will result in creating puddles on the roof, and over time this will lead to rainwater leaking inside the building, which will cause mould build-up and roof structural damage. *(RII and R27)*

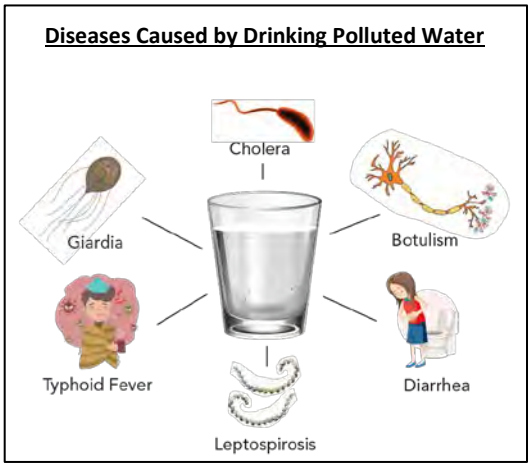
7.1.5. Related to Architectural and interior aspects in general:

7.1.5.1. Lack of Periodic Maintenance:



Building services, fixtures and networks are usually taken for granted. People tend to skip maintenance and fix any item only once damaged. But it should be noted that maintenance not only prevents risks before occurring but also extends the life of any item, system or fixture, allowing for cutting the costs of repairs on the long run.

7.1.5.2. Lack of drinking coolers:



Easy access to good quality of drinking water is vital for having healthy workers, otherwise drinking contaminated water or not drinking much lead to sickness. Drinking water that contains unsafe levels of contaminants, can cause health effects, such as gastrointestinal illnesses, nervous system or reproductive effects, and chronic diseases such as cancer.

While dehydration can lead to severe complications, such as seizures, swelling of the brain, kidney failure, shock, coma and even death.

The available water for consumption per person must not be less than 60 litres per day for personal consumption including drinking water.

(R25 and R26)

7.1.5.3. Doors, Windows, locks and latches in poor condition:

Operable doors and windows are needed to ensure privacy and security measures are met, and to ensure they create no injuries if broken, or act as obstacles (if blocked) in case of emergency. They also prevent stray animals and insects from coming in. *(RI)*

7.1.5.4. Insufficiently secured facility/site boundaries:

Inhabitants feeling safe and secured will be more satisfied with their living conditions, and as a result perform better at work.

So, safe routes, fences, gates and site boundaries (in addition to surveillance cameras and controlled access electrical systems) should be present in good condition. *(RI)*

7.1.5.5. The building envelope and room surroundings in general in poor condition. (Unstudied penetrations through the walls, exposed networks, and damaged surfaces):

Any unstudied penetration through the building structure (walls, floors or roofs) could lead to jeopardising its integrity (such as collapsing, damages to built-in water or heating networks or electrical wiring) and as a result risk the workers safety.

(No addition or variation to the original design of the building is allowed without gaining approvals from related authorities) *(RI)*

Any opening through the building envelop required for ducting, piping networks or else are to be properly sealed (in case needed).

7.1.5.6. Inadequate widths of corridors or improper conditions or pathways:

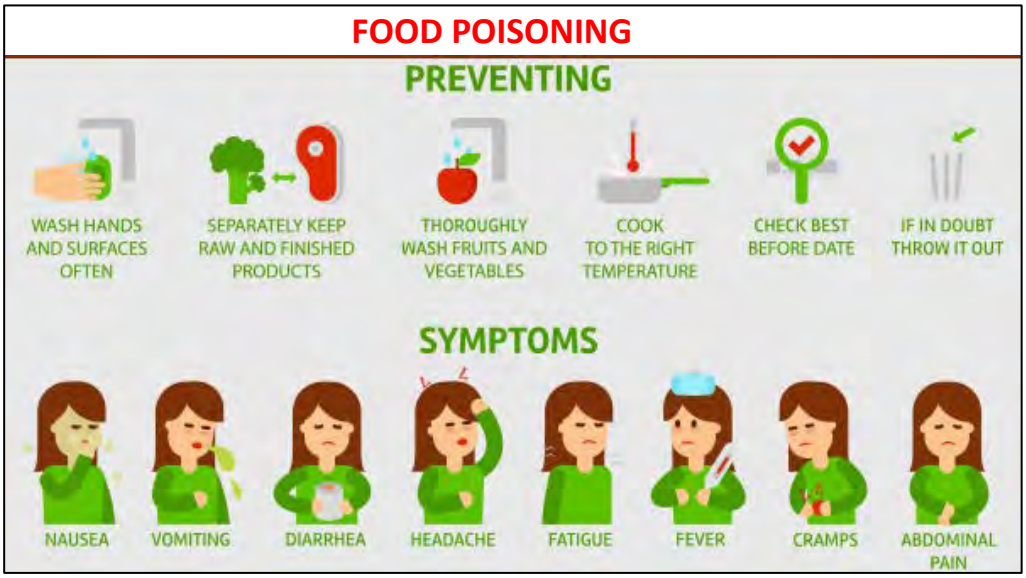
Certain measures should bet met related to the width of corridors/hallways in accordance with the use of space, areas and occupancy rates, as defined by building local and international codes and standards.

Widths of emergency pathways/ corridors are to be adequate (≥0.9cm wide) considering occupancy rates and free of obstacles.

(RI)

7.1.5.7. Improper location or condition of Cafeteria/ Dining area/ Kitchen or No safety measures taken for food preparation or within kitchen:

Rooms where food is stored, prepared, or eaten should be clean and well ventilated, to prevent cases of food poisoning. *(R24, R25 and R26)*



Wherever cooking is involved, all safety measures should be taken to prevent fire hazards (separated zones for cooking, with boundaries of fire rating qualities) and avoid gas leakage situations that could cause suffocation (gas leakage detectors should be available and in good working conditions).

Proper places should be designated for cooking food (Kitchen/Cafeteria) that may be available on each floor in the dormitory, or in one place for cooking food for the entire dormitory, including the following:

- Walls with ceramic tiles that are not less than 2 meters high.
- Safe source of drinking water and sink(s) for dishwashing.
- Separate cabinets for storing food and detergents.
- A refrigerator for keeping food.
- A cooker/oven for cooking food (zone to be protected against fire hazards or gas leakage).
- A self-closing screen door.
- Suction fans/ducts.
- Pest and rodent control devices.
- Proper waste baskets with a lid.
- The door of the sanitary facility must not open directly onto the kitchen or the dining room and the distance between the door of the sanitary facility and the kitchen or dining room door must not be less than 4 m.

7.1.5.8. Furniture in poor condition, not properly fixed, unstable, not suitably located:

Furniture used should be sound, in good condition, suiting the function of its location. Broken furniture could lead to injuries (if prone to fall) or cuts caused by splinters, or even death if stacked opposite to an exit/door, obstructing an emergency route.

In Bedrooms, If bunk beds are used, 3.5sq.m. applies for both workers in the lower and the upper bed. The distance between bunks ≥70cm and must meet safety measures. Stable closets/ storage units should be provided. Privacy is needed between workers so blinds/ partitions/ cabinets should be placed between beds.

In Cafeterias, fixed seats are preferred. Seating should be adequate with relevance to occupancy rates and in good condition (stable, safe and clean). Sufficient distancing between seats should be provided to ensure easy circulation and safe exit routes in case of emergencies.

(RI, R24 and R25)

7.1.5.9. Unsuitable finishing materials:

Finishes selected for each room should comply with its function, for example, wet areas (including toilets, laundry rooms and kitchens) are to be provided with non-slippery, easy to clean, waterproof, non-porous materials such as porcelain tiles, while emergency routes and stairs are to be of non-slippery floor tiles, other spaces like storages, shafts, mechanical and electrical rooms are to be provided with finishes of certain Fire resistance qualities…etc

(Refer to finishing materials specification suggested with relevance to the use of space in codes) *(RI, R24 and R25)*

7.1.5.10. Poor Indoor Environment Quality (IEQ):

There are two main categories of factors affecting IEQ:

- Physical Factors
- Non- Physical Factors

(See the following figure illustrating issues addressed under each category of factors)

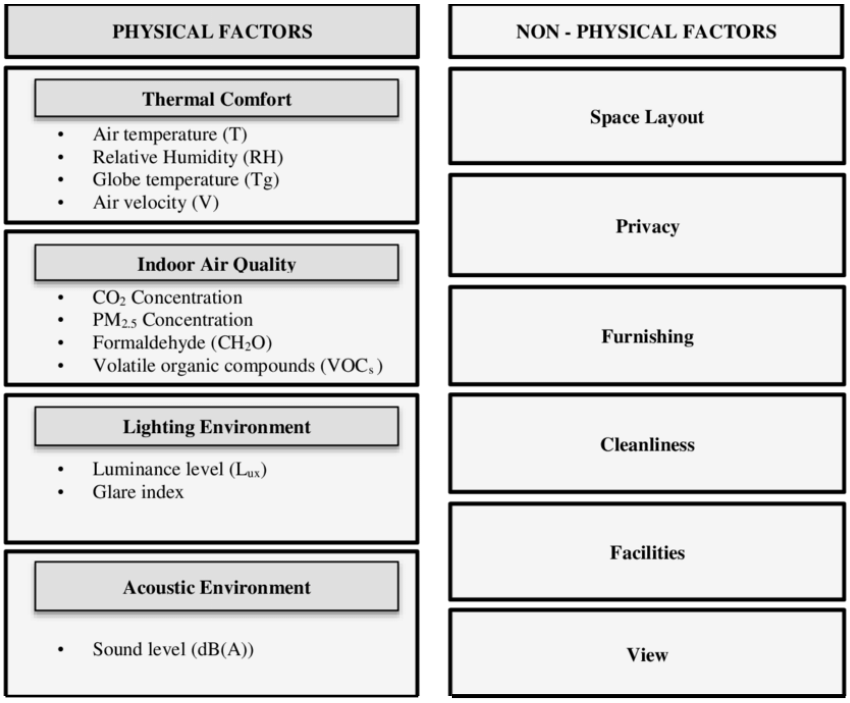


Figure 7-12: Physical and Non-Physical Factors affecting IEQ

All factors should be addressed to ensure good IEQ, with relevance to acceptable measures of each factor as per codes. *(R26, R28 and R30)*

For example, **related to some physical factors**:

- Under thermal comfort measure, humans generally feel comfortable between temperatures of 22 °C to 27 °C and a relative humidity of 40% to 60%.
- Related to sufficient and comfortable lighting; preferable illumination is 50 lux for circulation, 300 lux for bedrooms, bathrooms, and laundry rooms, 400 lux in offices, 500 lux in the kitchen.
- As for acoustical comfort, sounds at or below 70 dBA are generally considered safe (in residential areas preferable sound ranges are between 55 dB and 45 dB during daytime and night respectively). Any sound at or above 85 dBA is more likely to damage hearing over time.

And, in order to address some of the above factors, the following issues related to the dormitory building should be addressed;

- Location of dorm to be away from loud machinery noises.
- Pathways connecting between dorms and factories/workplaces to be secured and safe (to prevent accidents or injuries).
- To be away from chemicals, smokes, gases produced in the workspace or any source of pollution. The dormitory must be at least 500 meters away from any source of pollution, including carbon monoxide, sulphur dioxide,

nitrogen oxides or exhaust emissions; sewerage systems; wastewater; and noise pollution.

- Study orientation/ ensure adequate exposure to day light and nice views.
- Ensure adequate exposure to daylight and natural ventilation in existing occupied structures/rooms (sufficient window openings).

Disregarding any factor is reflected through undesired effects on the health of occupants in the indoor environment, reflecting negatively on the comfort, satisfaction, and productivity of inhabitants.

7.1.5.11. Missing or Improper conditions of laundry area and clothes hanging wires:

The dormitory must have a place designated for washing (by hand or by machine), with hangers and lines for hanging clothes outside the sleeping quarters or the kitchen at an average of 1 meter of clothesline per worker, taking the following into consideration *(R25)*:

- If washing machines and dryers are provided, it must ascertained that all washing machines, dryers, and electric are safely connected.
- Chemical substances that are used for cleaning, such as acids and other cleaning materials, must be stored safely to avoid burns, especially to the eye. These materials must be stored in a self-closing plastic container for waste collection.
- The washing and drying area must not be slippery.

7.1.5.12. Roof floor being improperly used, and in poor condition with relevance to lighting, insulations, rainwater drainage.

It is preferable for roof floor not to be accessible (locked/controlled access) for workers personal use, unless hanging wires are provided at this level. In general, proper lighting, roof insulation and rainwater drainage should be available (no clutter observed to prevent obstruction of rainwater drains). If roof is accessible, water tanks or any MEP equipment or fixtures installed above should be secured (bounded with controlled access), to avoid vandalism of these elements. *(RI, RII)*

7.1.6. Related to Public Health:

7.1.6.1. Bathrooms/Toilets/ Sanitary fixtures in poor conditions

All sanitary fixtures should be in good operable condition, to prevent injuries, water leakage, noncompliance to demand.

7.1.6.2. Inadequate distribution of trash bins. Improper types of bins used

Trash collecting area should be identified and adequate distribution of trash bins should be provided. A waste basket of proper size should be available at each sanitary facility/toilet. Self-closing plastic containers are to be used. Each floor must have 1 container or more for solid waste (3liters/ worker). Trash should be emptied at least once a day *(R25)*

7.1.6.3. Lack of first-aid boxes/ distributed unefficiently/ no medication provided/ In poor condition

First-aid boxes should be available in good condition (to be of lockable, made of durable material and well-fixed to walls at min 1m h. above FFL) including medicaments (along with a healthcare giver/ clinic if needed, with reference to the usage of the facility and the capacity loads of different loads). Certain authorized member (available and reachable at all times) should have the keys for opening boxes upon need. *(R25)*

7.1.6.4. Lack of control over existence of stray animals within facility

Surveillance (frequent inspection visits or monitoring of installed cameras) is needed over the existence of stray animal within dormitory buildings. Self-closing devices should be installed on doors, to help prevent their accessibility.

7.1.6.5. Lack of Insect Killers/Control Systems/ Wire mesh screens for windows or in poor condition

Windows and openings in building should be provided with soft metal screens preventing access of insects. Wire meshes (if provided) should be in good operational condition, properly fixed, free of holes or damages.

Another solution to this matter is sufficient distribution of insect killers, mainly where food is cooked or eaten, and in adjacency to trash collecting areas, especially in hot areas where flies abound. *(R25)*

The premises must be clean and free from waste, rubble, and stagnant water. Stagnant water, waste, insects, and rodents can lead to mosquito borne diseases, such as malaria and dengue fever, which are considered among the greatest hazards of stagnant water.

7.1.6.6. Lack of cleanliness and order

Filthiness and disorder jeopardise the safety and health of workers, so the following (5 C's plan) should be followed to ensure proper organization levels are met and good housekeeping practices are implemented:

Figure 7-13: The 5Cs Plan for Organization and Housekeeping

And as for the second part of this task "Guidance to assessment and repair of typical defects", the following table is provided as **guidance to corrective actions/repairs** suggested for the identified defects (with reference to the inspection checklist of task one), corresponding to the severity of the accompanied risk against previously set OSH measures:

Guidelines for assessment and repair of typical defects

Format no. 1

Defect Classification guide with reference to OHS standard parameters	
Fatal	The parameters of the defect are comparatively high and combined in a manner that causes, or could result in death, permanent total disability, or irreversible damage that violates law or regulation.
Major	The parameters of the defect exist at a level that does or will result in permanent partial disability, injuries or occupational illness that may result in hospitalization of at least three personnel, or reversible damage causing a violation of law or regulation.
Moderate	The parameters of the defect exist at recognizable levels and may result in injury or occupational illness resulting in one or more lost workdays, or damage without violation of law or regulation where restoration activities can be accomplished.
Minor	Some of the parameters exist at recognizable levels and can result in injury or illness not resulting in a lost workday or not violating law or regulation. The defect is easily recoverable.
Insignificant	None of the relevant parameters exist at a level that can cause injury or illness.

Table 3: Guidance for Assessment and Repair of Defects

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
General requirements/ Architecture				
	Jordan National Building Codes	- Accessibility (Pathways and corridors of appropriate widths and conditions)	Insignificant	Remove obstacles/ furniture within corridor intersecting with sufficietn widthes of corridors/ escape routes as per code.
			Minor	Remove obstacles. Cosmetic repairs.
			Moderate	Remove obstacles. Maintenance and repair works related to finishes and fixtures. Reconsider occupancy rates within floors related to corridors widths (with reference to codes)
			Major	Empty property and find an alternative.
			Fatal	Not Applicable.
	Jordan National Building Codes The Guide for Special Building Requirements for People with special needs	- HC accessibility (HC toilet provided) (Design adopts requirements for users with special needs)	Insignificant	Clean and maintain facilities adopting special design requirements related to people with special needs
			Minor	Frequent maintenance and repair works to be adopted and pathways to accommodate wheelchair, free of obstacles.
			Moderate	No workers with special needs are to accommodate the dorm
			Major	Not Applicable
			Fatal	Not Applicable
	Dormitories Inspection/	- Ensure proper occupancy rates for different areas. (3.5sq.m. per worker)	Insignificant	Comply with guide related to distances between beds.
			Minor	Repair works for furniture within rooms. Distribute workers over different rooms to meet the appropriate occupancy rates.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	Assessment Guide (2019)	(If bunk beds are used, 3.5sq.m. applies for both workers in the lower and the upper bed. The distance between bunks ≥70cm and must meet safety measures)	Moderate	Reconsider distribution of workers over rooms to meet approved occupancy rates. Repair works for furniture within rooms.
			Major	Try to transfer some workers to other dorms to meet the approved occupancy rates. Redistribute furniture within room. Accommodate all repair works and maintenance needed.
			Fatal	Not Applicable
	- Dormitories Inspection/ Assessment Guide (2019)	Laundry room and drying area provided. (1m length of hanging wire per worker outside)	Insignificant	Ensure proper use of fixtures and water taps as well as clotheslines provided. (Raise awarness of workers)
			Minor	Ensure all fixtures and water taps are in good condition. Frequent maintenance and repair works accomodated.
			Moderate	Forbid clothes being scattered in corridors, staircases or rooms. Identify a certain area for laundry and clotheslines. Repair works and maintenance for all fixtures/water taps needed.
			Major	Not Applicable
			Fatal	Not Applicable
	- Dormitories Inspection/ Assessment Guide (2019)	- Adequate room heights (min. 2.8m - max. 3.2m)	Insignificant	Ensure condition remains the same.
			Minor	Ensure enough bulkhead provided above upper level of bunkbed.
			Moderate	Reduce the number of workers within the room (reconsider bunkbeds). Distribute workers over other rooms to meet codes.
			Major	Reconsider the use of the space (not to be used as bedrooms). Transfer workers to other rooms/dorms.
			Fatal	Not Applicable

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- Dormitories Inspection/ Assessment Guide (2019)	- Adequate number of toilets, showers, and washbasins with reference to occupancy rates. (1toilet, 1 shower, 1 washbasin for 15 workers)	Insignificant	Keep clean and ensure properly used.
			Minor	Frequent cleaning and cosmetic repair works.
			Moderate	Frequent cleaning needed. Repair works and replacements of fixtures and fittings.
			Major	Maintenance and repair works that pertain demolishing and repair of some surrounding finishes, fixtures, MEP networks and structural elements. Facility not to be used for a certain period (provide alternative until problem is solved)
			Fatal	Not Applicable
	- Boiler Workbook provided by BWJ - Jordan National Building Codes	- Easy accessibility to refilling gas and diesel tanks. (Separated, well-ventilated and safe gas closets, diesel storage tanks and boiler rooms)	Insignificant	Continue frequent inspection and maintenance.
			Minor	Frequent maintenance and repair works needed.
			Moderate	Frequent maintenance and repair work to be implemented and recorded. Fire safety measures to be applied. Fire rated door and envelop repaired.
			Major	Fire safety measures to be followed. Fire rated doors and fire protected boundaries for the boiler room to be installed.
			Fatal	Evacuate property until danger is eliminated and safety measures are implemented
	-	- Guard houses provided. (For safety/ security surveillance/ Access controls)	Insignificant	Ensure surveillance cameras are in good working condition and guard is healthy and cautious
			Minor	Maintenance and repair works of cameras, fixtures and finishes within guard house.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Moderate	Repair works for guard house walls, floors, fixtures, surveillance cameras
			Major	Build / Identify Guard house and install surveillance cameras
			Fatal	Not Applicable
	-	- Steel/ secured doors for main gates and entrances. (Secured Facility borders including boundary walls and main entrance gates)	Insignificant	Ensure properly operation for Locks and steel doors and gates
			Minor	Maintain locks and ensure proper operation/ mechanism of doors and gates.
			Moderate	Repair works for locks and steel doors panels , accessories and hardwares, and finishes of doors.
			Major	Replacements and repair works related to installation, fixation of doors and gates, surrounding frames or walls, opening mechanisms, panels and accessories.
			Fatal	Ensure steel doors and gates are soundly fixed (not to fall over any worker upon movement) . New doors are to be installed, reinforcement of surrounding frames and walls.
	-	- Proper Indoor Environment Quality (Odors, Temperature and Humidity levels are comfortable as per international standards)	Insignificant	Ensure windows are opened frequently to let in fresh air.
			Minor	Ensure all mechanical fixtures/fans are in good working condition/ Fixed properly/ suffficietly distributed. Ensure all windows are in good conditon.
			Moderate	Repair/Replace/Provide fans/mechanical ventilation systems. Repair windows and ensure operable and frequently opened to exchange air. Identify the source of the improper Odors/Humidity/Tempreture levels, to solve the problem.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Installation/Maintenance works pertaining mechanical ventilation systems. Repair/provide openings/windows to ensure operable and in good conditon.
			Fatal	Facility not suitable for workers to live in. Empty property and look for an alternative dorm.
	-	- Finishing materials. (Suitable selection for different activities conducted)	Insignificant	Keep finishes clean.
			Minor	Repair finishes wherever needed.
			Moderate	Replace finishes used with alternatives that suit the use of space.
			Major	Cosmetic repairs/ replacements of some finishes, that might need a temporary evacuation of the subject room (transfer of workers to an alternative location until problem is solved)
			Fatal	Not applicable
	-	- Building envelope (from the exterior) and room surroundings (walls, floors, and ceiling from the inside) in safe and good condition.	Insignificant	Keep clean. Periodic maintenance.
			Minor	Frequent recorded maintenance and cosmetic repairs needed.
			Moderate	Repair/ Maintenance works related to walls, ceilings and floors.
			Major	Repair/ Maintenance works for walls, ceiling, floor slabs, finishes, and openings and all mounted fixtures. Might pertain the evacuation of some areas (transfer to alternative locations).
			Fatal	Not applicable
	-	- Roof/Top of Roof in proper conditions (Insulation, Lighting, and rainwater drainage)	Insignificant	Keep clean and organized. No obstacles towards rainwater drains.
			Minor	Clean and organize and remove any obstacles/ cluttering in rainwater drains.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Moderate	Frequent Cleaning and organization of roof needed. Ensure no vandalism of equipment installed on roof. Remove clutter in rainwater drains. Ensure insulation layers are properly installed/repair wherever needed. Secure parapets.
			Major	Provide lighting for roof. Secure roof, install and monitor surveillance cameras. with reference to electrical wires, parapets installed. Repair/Provide water and heat insulation on roof. Remove any obstacles towards rainwater drains. Repair drainage systems. Raise awareness towards proper use of the roof.
			Fatal	Secure roof, install surveillance cameras, provide handrail and parapets of sufficient heights, provide lighting, secure/repair equipment and MEP network exposed and installed on the top of the roof (exposed wires/ contaminated water tanks /damaged networks or pipes). Forbid any misuse of the roof floor level (controlled access). Remove obstacles towards rainwater drains (remove clutter)
	-	- Ensure furniture in proper conditions (rooms not to be packed) (shelves and cupboards to be secured to ensure stability) (fixed seats in cafeteria if provided to be adequate and in good condition)	Insignificant	Replace/Repair furniture with defects
			Minor	Provide/Repair and replace furniture with defects
			Moderate	Replace/ Provide furniture complying to requirements. Shelving and cupboards to be soundly fixed. All furniture to be in good condition and in proper location. Raise awareness between workers towards proper use.
			Major	Remove/Replace/Repair/Provide new furniture pieces of proper conditions in appropriate location.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Fatal	Not Applicable
	-	- No change for the use of space. (Compliance with the original design)	Insignificant	Maintain condition as is.
			Minor	Ensure the use of rooms comply with the original designs
			Moderate	Ensure no change of use with reference to original designs. Equip new areas of changed areas with all the needed requirements.
			Major	Eliminate changes with relevance to original designs. Equip and redesign spaces and gain authorities approvals related to any change of use for any space with relevance to original designs. This might pertain evacuation of space temporarily and transfer of users to alternative locations until problems are solved.
			Fatal	Evacuate area with defects. Look for alternative location for workers that complies to OSH requirements. Eliminate changes with relevance to original designs. Equip and redesign spaces and gain authorities approvals related to any needed change of use for any space with relevance to original designs.
	-	- Clinic provided within or close to the facility.	Insignificant	Ensure clinic is provided with all needed equipment and appointed personnel (health care provider)
			Minor	Monitor working hours of appointed personnel. Cosmetic repair and maintenance work for finishes, furniture, and equipment within clinic.
			Moderate	Repair works needed within clinic, related to finishes, furniture and equipment. Ensure all fixtures and equipment are in good working condition (fully equipped). Provide all medication tools within.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Identify a location that comply with requirements. Ensure equipped with all needed medication tools and furniture. Repair works that may pertain structural elements, MEP networks and fixtures, Interior finishes. Evacuate temporarily until problem is solved or look for another compatible location.
			Fatal	Provide a location that complies with all requirements, fully equipped and close to the sleeping area of workers.
	-	- Cafeteria/ Dining room/ Kitchen provided within or close to the facility and in good working and safe conditions.	Insignificant	Keep facility organized and clean and raise awareness between workers towards proper use of different appliances.
			Minor	Clean and organize facility. Cosmetic repairs for room surrounding finishes, equipment or appliances.
			Moderate	Implement/ Monitor frequent cleaning and maintenance works related to room surroundings, finishes, furniture, appliances, MEP networks and fixtures (ensure sufficient lighting and ventilation levels provided)
			Major	Clean facility (OSH procedures against any food contamination or poisoning hazards). To be fully equipped with all the needed furniture, appliances and well-ventilated
			Fatal	Provide a location that complies with all requirements, fully equipped and close to the sleeping area of workers.
	-		Insignificant	Frequent checks related to quality of water provided and conditions of water coolers/drinking fountains.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
		- Drinking Fountains/coolers provided and in good working conditions.	Minor	Sufficiently distribute drinking water coolers/fountains. Inspect quality of drinking water provided. Raise awareness between workers towards proper use of coolers/water taps.
			Moderate	Replace/Repair/Provide Additional or new drinking water coolers/fountains with tested drinking water.
			Major	Replace/ Provide new sources of drinking water. Sufficiently Distributed. Good quality of water to be provided (tested and monitored).
			Fatal	Not applicable
		- Signage provided (Facility name, room usage or number, directional or any other signs needed provided in all languages of resident workers).	Insignificant	Repair / properly fixed and distributed signs.
			Minor	Replace/Repair signs. Use durable materials. Fix properly. Distribute sufficiently.
			Moderate	Replace/Repair/Provide signage of durable materials. Properly fixed and distributed sufficiently.
			Major	Not applicable
			Fatal	Not applicable
		- OSH supervisor and HR Officer hired (Administrative Offices close to the dormitory) (Their contact numbers available, to be used after working hours in case of emergency.)	Insignificant	Raise awareness between workers about their contact list for the assigned OSH supervisor and HR Officer.
			Minor	Raise awareness. Distribute Contact Lists. Monitor working hours of the assigned officers.
			Moderate	Raise awareness. Distribute Contact Lists. Monitor work/Assign officers. Ensure professional and responsible members assigned.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Not applicable
			Fatal	Not applicable
		- Doors, windows, locks, and latches are in good working order. - Special concern related to doors mechanism along emergency routes.	Insignificant	Frequent maintenance of doors, windows, locks and latches.
			Minor	Cosmetic repairs. Maintenance and repair works related to door panels, windows, locks and latches.
			Moderate	Replace/ Repair Doors, windows, hardware and accessories. Ensure properly fixed and insulated.
			Major	Install new Doors, windows with all the needed hardware and accessories and ensure soundly fixed and properly insulated.
			Fatal	Not applicable
		- Check schedules and records of maintenance and repair works conducted by the facility management. - (Repair works for finishes, MEP fixtures, equipment, furniture, accessories and hardware of windows and doors). (Preferably to be conducted and recorded every 6months and upon detecting damage)	Insignificant	Continue recording of periodic and frequent maintenance.
			Minor	Conduct frequent maintenance and repair works. Keep records of all related works conducted.
			Moderate	Frequent Maintenance and periodic monitoring of different systems needed. All works to be recorded. Maintenance team assigned and schedules identified.
			Major	Maintenance and repair works needed. Assign a maintenance team to monitor different systems and record frequent maintenance and repair works conducted
			Fatal	Not applicable

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
Structural Integrity				
General Data				
		- Available Documents (Accuracy of blueprints; ensure the building is built according to the design approved plans with no deviations.)	Insignificant	No action required.
			Minor	No action required.
			Moderate	The building is being used for a purpose not matching the design function. Accordingly, specialized engineer should be consulted to determine if the building may support the new loads.
			Major	The building is being used for a purpose not matching the design function. Accordingly, specialized engineer should be consulted to determine if the building may support the new loads.
			Fatal	Not Applicable.
		- Periodic Maintenance (Structural Only).	Insignificant	No action required.
			Minor	Periodic visual inspection should be made by the administrator to mark the minor defects and proceed with the simple repairs.
			Moderate	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed.
			Major	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				The location where a major defect occurs might be cleared until it is repaired.
			Fatal	Not Applicable.
Structural Integrity Against Seismic Loading				
	- (International) Uniform Building Code (UBC 1997) - Jordanian National Building Code- Earthquake Resistant Buildings.	- Shape Regularity.	Insignificant	No action required.
			Minor	Not Applicable.
			Moderate	Not Applicable.
			Major	Not Applicable.
			Fatal	Not Applicable.
	- (International) Uniform Building Code (UBC 1997) - Jordanian National Building Code- Earthquake Resistant Buildings.	- Shear Walls Existence and continuation to ground. And occurrence of soft story.	Insignificant	No action required.
			Minor	Not Applicable.
			Moderate	The As-built drawings must be provided (new survey to be made if not exist) in addition to the Visual inspection made by the specialized structural engineer to proceed with the structural modeling of the existing building. Type of rehabilitation and strengthening of building to be decided in accordance with the structural calculations and modeling results only.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	The As-built drawings must be provided (new survey to be made if not exist) in addition to the Visual inspection made by the specialized structural engineer to proceed with the structural modeling of the existing building. Type of rehabilitation and strengthening of building to be decided in accordance with the structural calculations and modeling results only.
			Fatal	No strengthening or rehabilitation can be done. The building should not be used for any residential issues. Demolishing and reconstruction to be considered.
	- Jordanian Code of Loads and Forces, 2006. - (International) Uniform Building Code (UBC 1997) - Jordanian National Building Code- Earthquake Resistant Buildings.	- Excessive gravity loads. (Especially in upper stories).	Insignificant	No action required.
			Minor	Rearrangement to be done by the administrator to redistribute or minimize unnecessary loads.
			Moderate	Rearrangement to be done by the administrator to redistribute or minimize unnecessary loads.
			Major	The As-built drawings must be provided (new survey to be made if not exist) in addition to the Visual inspection made by the specialized structural engineer to proceed with the structural modeling of the existing building. Type of rehabilitation and strengthening of building to be decided in accordance with the structural calculations and modeling results only.
			Fatal	Not Applicable.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
General Design Loading				
	- Jordanian Code of Loads and Forces, 2006.	- Floors Slabs Loading.	Insignificant	No action required.
			Minor	Rearrangement to be done by the administrator to redistribute or minimize unnecessary loads.
			Moderate	Rearrangement to be done by the administrator to redistribute or minimize unnecessary loads.
			Major	The As-built drawings must be provided (new survey to be made if not exist) in addition to the Visual inspection made by the specialized structural engineer to proceed with the structural modeling of the existing slabs. Type of rehabilitation and strengthening of building to be decided in accordance with the structural calculations and modeling results only.
			Fatal	Not Applicable.
	- Jordanian Code of Loads and Forces, 2006.	- Roof Slab Loading.	Insignificant	No action required.
			Minor	Rearrangement to be done by the administrator to redistribute or minimize unnecessary loads.
			Moderate	Total number of water tanks should be reduced to be in the range of the allowable loads. Other mechanical method may be used (tanks on ground level + pumps) to reduce the number of water tanks on roof

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				If this action cannot be made due to the high demand of water tanks. Then a specialized engineer should be consulted to give recommendation on strengthening of roof slab.
			Major	Following the corrective actions indicated in the (Moderate case) in addition to an essential visual inspection done by specialist to indicate all the resulting defects and repairs recommendation.
			Fatal	Following the corrective actions indicated in the (Moderate case) in addition to an essential visual inspection done by specialist to indicate all the resulting defects and repairs recommendation. The building may be cleared from all workers until all rehabilitation is done.
Check of structural elements against typical defects (Concrete / Steel)				
	- The Handbook of Repair and Rehabilitation of RCC Buildings. - Jordanian Code of thermal insulation, 2009.	- Water leakage in slabs.	Insignificant	No action required.
			Minor	The source of leakage should be identified and repaired immediately. Then simple repairs might be done where needed.
			Moderate	The source of leakage should be identified and repaired immediately. Then all repairs must be done where needed.
			Major	The source of leakage should be identified and repaired immediately. Then a visual inspection by specialist should be done

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				and given recommendation should be followed to repair the resulting defects.
			Fatal	Not Applicable.
	- The Handbook of Repair and Rehabilitation of RCC Buildings.	- Spalling in concrete cover and plastering.	Insignificant	No action required.
			Minor	Simple repairs and plastering should be done to the element.
			Moderate	Bonding agent with new concrete should be done if the reinforcing bars are exposed and clearly seen.
			Major	In addition to the corrective action in the moderate case, strengthening of element might be needed in accordance with the recommendation of the engineer.
			Fatal	Not Applicable.
	- Jordanian Code for Plain and Reinforced Concrete JBC5-93 (All Parts).	- Cracks in Non-Structural elements and roofs parapets.	Insignificant	No action required.
			Minor	Visual inspection should be made by the administrator to mark the minor defects and proceed with the simple cosmetic repairs.
			Moderate	Visual inspection should be made to mark the moderate defects and proceed with the repairs done by specialized workers.
			Major	The element to be demolished and reconstructed.
			Fatal	The element to be demolished and reconstructed.
	- Jordanian Code for Plain and Reinforced	- Cracks in Structural elements and signs of corrosion.	Insignificant	No action required.
			Minor	Visual inspection should be made by the administrator to mark the minor defects and proceed with the simple repairs.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	Concrete JBC5-93 (All Parts). - (International) Building Code Requirements for Structural Concrete ACI 318M-19. - (International) British Standard- Structural use of concrete - BS 8110.		Moderate	Visual inspection should be made by specialized engineer to mark the moderate defects and give his recommendation Specialized workers to proceed with the repairs.
			Major	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report (or recommendation) that should be followed. The location where a major defect occurs might be cleared until it is repaired.
			Fatal	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report (or recommendation) that should be followed. The location where a major defect occurs might be cleared until it is repaired.
	- Jordanian Code for steel structures.	- Steel Structures general conditions	Insignificant	No action required.
			Minor	Minor defects should be marked for simple repairs.
			Moderate	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed. The location where a major defect occurs might be cleared until it is repaired.
			Fatal	The structure to be demolished and reconstructed as per the new codes/requirements.
	- Jordanian Code for Plain and Reinforced Concrete JBC5-93 (All Parts). - (International) Building Code Requirements for Structural Concrete ACI 318M-19.	- Position of nearby plants (ex: boilers rooms), possibility of explosion and their proximity to critical structural elements.	Insignificant	No action required.
			Minor	Not Applicable.
			Moderate	Not Applicable.
			Major	Loads due to fire and explosion as per codes and concrete cover should be considered in the design stage. As for existing buildings, specialized structural engineer should recommend the method of strengthening and rehabilitation to be followed.
			Fatal	Not Applicable.
	- Jordanian Code for Plain and Reinforced Concrete JBC5-93 (All Parts).	Settlement in ground S.O.G and differential movement across expansion joints (if any). And column - foundation settlement.	Insignificant	No action required.
			Minor	No action required.
			Moderate	Removal of existing finish (tiles), compaction of beneath fill and 10cm reinforced concrete layer casting should be done before laying the new architectural finish.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- (International) Building Code Requirements for Structural Concrete ACI 318M-19. - (International) British Standard- Structural use of concrete - BS 8110.		Major	Removal of existing finish (tiles), compaction of beneath fill and 10cm reinforced concrete layer casting should be done before laying the new architectural finish.
			Fatal	Not applicable.
	- Jordanian Code of thermal insulation, 2009.	- Insulation of roof slab.	Insignificant	No action required.
			Minor	Proper insulation should be installed by a specialized provider.
			Moderate	Proper insulation should be installed by a specialized provider.
			Major	Proper insulation should be installed by a specialized provider.
			Fatal	Not Applicable.
	- Jordanian Code for Plain and Reinforced Concrete JBC5-93 (All Parts). - (International) Building Code Requirements for Structural	- External site reinforced concrete structures.	Insignificant	No action required.
			Minor	Minor defects should be marked for simple repairs.
			Moderate	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed.
			Major	Visual inspection should be made by specialized structural engineer to mark the defects and write the inspection and rehabilitation report that should be followed.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	Concrete ACI 318M-19. - (International) British Standard- Structural use of concrete - BS 8110.			The location where a major defect occurs might be cleared until it is repaired.
			Fatal	Element to be demolished and reconstructed.
Electrical Safety	*(Refer to Jordanian and International codes)*			
Power System				
	- British standards (BS7671) - Jordanian local Electrical installation code	- Ensure no overloading.	Insignificant	Periodic check to make sure the workers are not used the cable extensions cords in unproper way.
			Minor	Periodic check to make sure the workers are not used the cable extensions cords in unproper way. Use fixed extension cords to limit number of connections when necessary.
			Moderate	Remove all additional loads and unnecessary extension cords. Connect all additional socket outlets to new circuit breakers from the distribution board. Reduce the overall load by replacing incandescent or halogen light bulbs with energy-efficient LED (preferably) or CFL (fluorescent) bulbs.
			Major	Remove all additional major loads.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				Upgrade the electrical network where required including the circuit breakers, cables, and distribution boards.
			Fatal	Add monitoring instrument (multi-meter, power meter) to each final distribution board and check them periodically and take the necessary actinon when needed.
	- British standards (BS7671) - Jordanian local Electrical installation code	- Exposed covered wires and DB/ not missing covers for sockets/outlets.	Insignificant	Periodic check to make sure no exposed wires and all covers are fixed properly.
			Minor	All exposed cables shall be enclosed in conduits or trunks. All electrical connections and pull boxes shall be covered.
			Moderate	Uncovered distribution boards shall be covered. All exposed connections inside the distribution boards shall be covered and away from human being or reach.
			Major	All unshielded wires shall be replaced. All unshielded cables shall be replaced with shielded cables and enclosed in conduits or trunks to prevent shock hazard.
			Fatal	Damaged cables due to overload heating or current should be totally replaced.
	- British standards (BS7671) - Jordanian local Electrical installation code	- Waterproof outlets provided within kitchens or wet areas/ outdoor.	Insignificant	Connect all circuits in wet areas to residual current device (RCD).
			Minor	All damaged waterproof outlets shall be replaced with proper covered outlets.
			Moderate	All outdoor fixtures and outlets shall be replaced with waterproof outlets.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				All fixtures and outlets in wet areas or close to any water source shall be replaced with waterproof outlets.
			Major	Power distribution boards inside wet areas should not be accepted, relocation to proper place is advised.
			Fatal	All electrical fixtures and outlets in explosion areas such as rooms with LPG (Liquid pressure gas cylinder) storges shall be replaced with explosion proof outlets.
	- British standards (BS7671) - Jordanian local Electrical installation code	- Ensure safe connection to DB and boards are not exposed/ controlled/ located in a way to avoid vandalism.	Insignificant	Periodic check to all distribution boards should be implemented.
			Minor	Uncovered and open distribution boards shall be covered and closed properly.
			Moderate	The distribution boards shall be relocated to safe place away from any leakage pipes or wet areas. The final distribution board shall be relocated to safe place out of dormitory room.
			Major	All exposed busbars and breakers shall be fixed in a new enclosure with a suitable ingress protection.
			Fatal	Relocate and replace all distribution boards and main distribution boards far from water sources.
	- Jordanian local Earthing and lightning code	- Earthing system provided.	Insignificant	Periodic test for overall earthing system overall resistance.
			Minor	Connect all branch circuits to the earthing system. Add earthing pits to achieve the required resistance.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				Replace all earthing cables with the suitable cross section areas as per British and local standards.
			Moderate	Provide earthing system to the building if not existing.
			Major	Not applicable.
			Fatal	Not applicable.
Lighting System				
	- Jordanian local lighting code.	- Adequate lighting/ distribution of lighting fixtures.	Insignificant	No action required.
			Minor	Maintained all fixtures and replace all damaged bulbs.
			Moderate	Provide Adequate lighting distribution in the unilluminated or dark areas. All bulbs shall be provided with diffusers or housing.
			Major	Not applicable.
			Fatal	Not applicable.
	- Jordanian local Electrical installation code.	- Lighting fittings, fixtures and ceiling fans are properly installed and in good working condition.	Insignificant	regular maintenance for lighting fixture and ceiling fans, replacement should be followed and implemented.
			Minor	All lighting fixtures and ceiling fans shall be fix in a proper way. Missing fitting screws should not be accepted, all screw holes should be suited with a proper screw size.
			Moderate	Hanged items to the ceiling fans should be removed immediately.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Not applicable.
			Fatal	Not applicable.
Security System				
	- CCTV code (Jordan National Building council)	- Cameras provided where needed.	Insignificant	Provide surveillance cameras over missing staircases and outdoor borders.
			Minor	Provide surveillance cameras system at dormitory Building
			Moderate	Not applicable.
			Major	Not applicable.
			Fatal	Not applicable.
Fire Safety				
Architecture				
	- Jordanian Fire Protection Code	- Lengths of corridors at dead ends as per codes. (not more than 10m long if no sprinklers are provided).	Insignificant	Keep clean and organized.
			Minor	Ensure areas further than approved lengths at dead ends are not frequently used/ occupied.
			Moderate	Ensure area beyond approved lengths at dead ends are not used.
			Major	Some construction/building work might be needed to comply with codes. Area beyond approved lengths are to be blocked or space to be used differently. Issue to be discussed with related authorities.
			Fatal	Not Applicable
			Insignificant	No action needed

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- Jordanian Fire Protection Code	- Widths and finishes of emergency pathways/corridors to be adequate, safe, considering occupancy rates and free of obstacles.	Minor	Relocate/Remove furniture or any elements at the side of the pathways, to provide the adequate width of the corridor and ensure safety of occupants when trying to escape in cases of emergency.
			Moderate	Remove/ Relocate any obstacle along the emergency routes. Ensure adequate widths are provided with relevance to occupancy rates. Try to reduce number of occupants in each floor to comply with codes (Distribute workers on different rooms on multiple floors)
			Major	Remove/ Relocate any furniture/obstacle along the emergency routes. Ensure adequate widths are provided with relevance to occupancy rates. Empty some rooms or redistribute workers on multiple floors over additional rooms to ensure occupancy rates of each floor level complies with the approved corridor widths as per codes. If no vacancy available within the same property, workers are to be transferred to another dorm.
			Fatal	Not Applicable.
	- Jordanian Fire Protection Code	- Steps/ stairs and ramps are in safe conditions/ of appropriate dimensions/ non-slip surfaces/ secured with handrails wherever needed. - (Stairs and corridors along the escape route to be protected from fire and smoke, all the way	Insignificant	Ensure finishes/handrails are frequently cleaned and repaired.
			Minor	Maintenance works needed for certain areas (finishing materials for walls, ceiling and floors/steps). Ensure handrails if existing are in good condition (appropriate heights) .
			Moderate	Repair works needed for Steps, walls, floors, ceiling, handrails or whatever else needed related to the fire and smoke protection.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
		to the final exit from the building)	Major	Repair works related to Steps, walls, floors, ceiling, handrails or whatever else needed related to the fire and smoke protection. Seek an alternative way out/escape route/staircase.
			Fatal	Use/ construct an alternative escape route/staircase.
	- Jordanian Fire Protection Code	- Partitions' heights in bedroom to reach ceiling (full height)/ separation between rooms/ protection against vast fire spread.	Insignificant	No action needed
			Minor	Ensure full separation between rooms to prevent fire spread
			Moderate	Provide full separation/ raise partitions heights.
			Major	Build new partitions to ensure full separation to prevent vast fire spread. Might need gaining authorities approvals if changes are needed to the original design drawings. Temporary evacuation of the property or transferring workers to an alternative location might be needed.
			Fatal	Construction works needed. Modify design drawings. Evacuate dorm until problem is served. Refer to authorities to gain the needed approvals related to design changes.
	- Jordanian Fire Protection Code	- Doors at fire exits to be FR and equipped with self-closing devices and hardware as per codes.	Insignificant	Ensure all FR doors and all devices and hardware installed are in good working condition
			Minor	Repair FR doors with all installed devices and hardware wherever needed.
			Moderate	Install/Repair FR Doors with all the required devices and hardware as per codes wherever needed.
			Major	Install FR doors with all the required devices and hardware as per codes wherever needed. Noting that some repair/construction

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				works might be needed for the door opening/frame to ensure door is properly fixed and opening is sealed.
			Fatal	Restudy all areas with reference to code requirements related to Fire rating requirements. Evacuate/transfer workers until problem is solved.
	- Jordanian Fire Protection Code	- Vertical shafts and storage rooms to be provided with FR enclosures and doors as per codes.	Insignificant	No action needed
			Minor	Maintenance works needed to ensure proper FR enclosures. (Specially related to room borders and FR Doors)
			Moderate	Maintenance/ Repair works related to FR enclosures (working conditions of FR Doors with all relevant devices and hardware. As well as bounding walls, ceiling and floors conditions.
			Major	Secure against fire as per code requirements (Secure Boundaries related to walls, ceiling and floor finishes). Install FR doors equipped with all special devices and hardware.
			Fatal	Empty/close shaft or storage. Not to be used. Might pertain construction works/design changes which need acquisition of authorities' approvals.
	- Dormitories Inspection/ Assessment Guide (2019)	- Clear directional signs towards emergency exists/ evacuation plans and emergency contact lists provided in all languages of resident workers.	Insignificant	No action needed
			Minor	Clean. Modify text. Properly fix signs.
			Moderate	Add Signs wherever missing. Use durable materials for signs. Ensure text on sign is provided in all languages spoken by workers accommodating the dorm. Ensure properly fixed in appropriate well seen locations.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Not applicable
			Fatal	Not applicable
	-	- Clear and safe assembly point/area identified.	Insignificant	No action needed (Keep area well identified, safe and clean)
			Minor	Identify borders of area with signs. Keep clean and vacant.
			Moderate	Clean and organize area. Remove clutter or scattered elements within. Identify borders/location using proper signs.
			Major	Seek for an appropriate area with an adequate size and conditions to comply to requirements as per codes. Ensure route towards the area is safe and free of obstacles.
			Fatal	Certain design changes are needed. Authorities approvals to be gained. Transfer workers or search for alternative until problem is solved. Certain areas might need to be evacuated to provide a certain assembly area.
	- Jordanian Fire Protection Code	- Lengths of escaping routes/exits (travel distances) as per codes.	Insignificant	No action needed (keep routes clean with no obstacles.)
			Minor	Remove obstacles and keep routes clean.
			Moderate	Block access towards areas beyond accepted lengths of escape routes.
			Major	Close/empty spaces beyond accepted lengths of escape routes. Change use with reference to accepted structural loads and fire protection measures. Approvals from authorities might be needed if design changes occur.
			Fatal	Close/empty spaces beyond accepted lengths of escape routes. Change use with reference to accepted structural loads and fire

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
				protection measures. Approvals from authorities might be needed if design changes occur.
	- Jordanian Fire Protection Code	- No. of exits with ref to room area and capacity loads. (Alternative means of escape provided from each floor)	Insignificant	Ensure exits are In safe working condition. (operable doors)
			Minor	Ensure all exits (doors and devices in good working condition). Ensure emergency route towards exits are free of obstacles.
			Moderate	Reduce occupancy within area to comply with codes related to the number of exits provided
			Major	Provide an alternative/ additional exit (equipped with all relevant door, devices and hardware needed). Study occupancy rates with relevance to number of exits provided.
			Fatal	Empty Room. Construction works. Design changes. Authorities' approvals needed.
	- Jordanian Fire Protection Code	- Easy accessibility for Civil Defense vehicles and ambulance.	Insignificant	No action needed.
			Minor	Ensure easy access is provided.
			Moderate	Keep access for civil defense vehicles free of obstacles.
			Major	Provide Civil Defense access. Design change might be needed.
			Fatal	Access needed. Design change needed. Authorities approvals needed.
Mechanical				
	- NFPA14/ standard for the	- Distribution of Hose Real Cabinets.	Insignificant	Hose reel cabinets are easily accessible and well distributed, no action needed.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	installation of standpipe and hose system. - Jordanian firefighting code.		Minor	The number of hose reel cabinets is sufficient but are not well-distributed, hose reel cabinets must be redistributed.
			Moderate	Hose reel cabinets are not sufficient in number, additional hose reel cabinets must be added in the dormitory to ensure coverage of the whole dormitory areas.
			Major	The number of hose reel cabinets is not sufficient and are not well distributed, hose reel cabinets should be redistributed, and additional hose reel cabinets should be added to ensure the coverage of the whole dormitory areas.
			Fatal	Hose reel system must be installed in the dormitory.
	- NFPA14/ standard for the installation of standpipe and hose system. - Jordanian firefighting code.	- No vandalism of cabinets occurring.	Insignificant	Routine maintenance only.
			Minor	Minor maintenance work should be done on the fire hose reel cabinets.
			Moderate	Major maintenance work should be done on the fire hose reel cabinets.
			Major	Maintenance work should be done on the fire hose reel cabinets to ensure that the hose reel cabinets are working.
			Fatal	Major maintenance work should be done on the fire hose reel cabinets to ensure that the hose reel cabinets are working.
	- NFPA17/ standard for dry	- Distribution of Portable fire extinguishers (Powder and CO2)	Insignificant	Routine maintenance only.
			Minor	Fire extinguisher locations must be known and easily accessible.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	chemical extinguishing system. - Jordanian firefighting code.		Moderate	Proper fire extinguisher types should be available in the dormitory (CO_2 fire extinguishers for the electrical rooms and powder fire extinguishers for all the other areas in the dormitory)
			Major	Fire extinguishers must be maintained every six months and must be sufficient in number.
			Fatal	Fire extinguishers should be added in the dormitory.
	- NFPA. - Jordanian firefighting code.	- Distribution of sprinklers as per code. Connected to a fire alarm system.	Insignificant	Sprinkler system not required; no action needed.
			Minor	Routine maintenance only.
			Moderate	Maintenance work is required for the system.
			Major	Major maintenance work is required for the system to ensure that the system is working.
			Fatal	Install fire sprinkler system in the dormitory if required by the code.
	- NFPA. - Jordanian firefighting code.	- Existence of fire hydrant	Insignificant	Fire hydrant not required; no action needed.
			Minor	Routine maintenance only.
			Moderate	Maintenance work should be done on the fire hydrant.
			Major	Maintenance work should be done on the fire hydrant to ensure that the fire hydrants are working.
			Fatal	Install fire hydrant system if required by the code.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
Electrical				
	- NFPA. - Jordanian firefighting code.	- Ensure continuous/ periodic maintenance applied to different systems.	Insignificant	A Periodic maintenance plan applied, and records kept of maintenance; no action required.
			Minor	periodic maintenance plan shall be applied, and records kept of maintenance.
			Moderate	Not Applicable.
			Major	Not Applicable.
			Fatal	Not Applicable.
	- Fire Detection & Fire Alarm System Code - (Jordan National Building council) - NFPA 72 & BS 5839-1	- Providing a fire alarm system (audible evacuation alarm sirens)	Insignificant	A Periodic maintenance plan applied; no action required.
			Minor	periodic maintenance plan shall be applied.
			Moderate	All areas shall be covered by the detectors as required by Jordanian Code and civil defense requirements. Add manual call pints at exit routes. Connect all automatic doors, elevators (if any), HVAC, Access control system …etc., as required by code civil defense directorate to the fire alarm system.
			Major	Provide a fire alarm system approved by the civil defense directorate including all required items (detectors, sirens, control panel, manual call point and all other devices as deem needed.
			Fatal	Not Applicable.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- Fire safety code (Jordan national Building Code) - British standards (BS5266)	- Emergency lighting provided and exit signs illuminated and free of damage	Insignificant	A Periodic maintenance plan and check applied to the lighting fixture and batteries; no action required.
			Minor	Make sure all exit signs and emergency lighting are connected properly. Noting that exit signs shall be connected directly to the distribution board without a socket outlet to ensure the exit signs work in emergency cases.
			Moderate	Provide illuminated exit signs and emergency lighting with built-in batteries to cover all missing areas in escape routes and exits.
			Major	Provide illuminated exit signs and emergency lighting with built-in batteries to cover all escape routes, exits and hose reels.
			Fatal	Not Applicable.
Public Health				
Architectural Configuration				
	-	- Location of Dorm *(with reference to adjacency to the manufactory and exposure to pollution or any other health hazards.)*	Insignificant	No action needed.
			Minor	Ensure all openings/building boundaries are in good condition/ well insulated against any source of pollution.
			Moderate	Maintenance and repair works related the building boundaries/ doors and windows to ensure proper insulation against any source of pollution.
			Major	Transfer Workers to an alternative location.
			Fatal	Empty property. Seek and alternative location.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	-	- Openings and Orientation of Dorm *(with reference to adequate exposure to daylight and ventilation)*	Insignificant	No action needed.
			Minor	Ensure windows at openings are in good working condition.
			Moderate	Maintenance and repair works wherever needed for windows at opening or for mechanical ventilation systems installed.
			Major	Provide openings/ Install mechanical ventilation systems. Authorities approvals related to design changes to be gained.
			Fatal	Empty property. Construction works needed. Authorities' approvals related to design changes to be gained.
Mechanical Systems				
	- Uniform plumbing code. - Jordanian plumbing code.	- Sanitary Drainage *(Ex. Occlusion of internal sewage network)*	Insignificant	Routine maintenance only
			Minor	Minor maintenance work should be done on the sewage network.
			Moderate	Maintenance work should be done on the inside and outside drainage network and sanitary fixtures.
			Major	Sanitary fixture units should be connected to the drainage network. Drainage network should be maintained to resolve all the occlusion problems. Cesspools and septic tanks should be checked and verified with the codes and standards.
			Fatal	Not applicable.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- Uniform plumbing code. - Jordanian plumbing code.	- Domestic water supply (potable water for drinking and washing)	Insignificant	Routine maintenance only.
			Minor	Maintenance work should be done on the water cabinets.
			Moderate	Maintenance work is required for the water network. roof water tanks should be replaced.
			Major	Maintenance and replacement works are required. Water tank covers should be added. leakage inspections should be done on the water network.
			Fatal	Not applicable.
	- Uniform plumbing code. - Jordanian plumbing code.	- (Providing mixers for hot and cold-water systems) (ensure water cabinets are closed/controlled)	Insignificant	Routine maintenance only.
			Minor	Water mixers should be installed in the dormitory. Water cabinets should be maintained and covered.
			Moderate	Water cabinets should be maintained to ensure that no leakage is present.
			Major	Not applicable.
			Fatal	Not applicable.
	- ASHRAE standard 62	- Ventilation (Ex. Insufficient ventilation in toilets, bathrooms, and bedrooms)	Insignificant	Routine maintenance only.
			Minor	Minor maintenance work should be done on the ventilation system.
			Moderate	Major maintenance work should be done on the ventilation system.
			Major	Ventilation fans should be installed in the kitchen and toilets or replaced if they are damaged.
			Fatal	Not applicable.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
	- ASHRAE standard 62	- Central heating/ AC	Insignificant	Routine maintenance only.
			Minor	Minor maintenance work should be done on the Heating and AC system.
			Moderate	Maintenance work should be done on the heating and AC system. leakage inspections should be done on the heating network.
			Major	Heating system should be installed.
			Fatal	Fuel tanks should be inspected and replaced if needed to ensure that no leakage is present.
	- ASHRAE standard 62	- Adequate temperature and Humidity levels within different spaces.	Insignificant	Adequate temperature and humidity levels, no actions needed.
			Minor	Humidity levels should be controlled to be less than 65%.
			Moderate	Humidity levels should be controlled to be less than 65%.
			Major	Humidity levels should be controlled to be less than 65%.
			Fatal	Not applicable.
	- Jordanian code for gas system installation in buildings	- LPG System (Check for Safety Requirements/ Gas leakage detectors/ location away from highly occupied areas)	Insignificant	No LPG system available in the dormitory, no actions needed.
			Minor	Routine maintenance only.
			Moderate	Minor maintenance work should be done on the LPG system.
			Major	Maintenance work should be done on all LPG system equipment (Isolating valves, regulators …) to ensure that the equipment are working properly.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Fatal	Workers should not be allowed to use the portable gas stoves in the bedrooms and instead the workers should use these stoves in the designated cooking areas. Gas leak detection system should be installed. LPG system installation should comply with the code. Leakage inspection should be done on the LPG system to ensure that no leakage is present.
	- Uniform plumbing code. - Jordanian plumbing code.	- Rainwater drainage	Insignificant	Routine maintenance only.
			Minor	Minor maintenance work should be done on the rainwater system to ensure that no leakage present.
			Moderate	Rainwater pipes should be maintained.
			Major	The area around the rainwater drain outlet should be cleared and pipes on the roof should be installed on pipe supports. Rainwater outlets should be maintained.
			Fatal	Not applicable.
Public Health Issues	International codes and MoH requirements			
		- Cleanliness and order as per codes.	Insignificant	Keep property clean and in good order
			Minor	Ensure frequent cleaning and organization works
			Moderate	Assign tasks to certain members related to cleaning and organization works. Frequently conducted.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Major	Empty different spaces and rooms frequently to organize and clean thoroughly.
			Fatal	Not Applicable
		- Food preparation and kitchen safety, cleanliness, and locations (sufficient and properly working equipment)	Insignificant	Wash dishes. Clean Facility. Store and Cook Food properly.
			Minor	Surveillance over food preparation. Clean Kitchen/Dining area and dishes. Ensure stored food used is in good condition.
			Moderate	Enhance conditions within Kitchen (related to cooking, food storage and cleaning)
			Major	Maintenance, Cleaning, and repair works needed for all defected equipment, furniture, facility. Provide all the needed food cooking and storage equipment and ensure in good working condition. Surveillance over food cooking preparation.
			Fatal	Assign new members to handle the cooking and cleaning services. Provide an alternative location complying to all health and safety measures.
		- Insects Killers distributed wherever needed (steel wire mesh screens provided for windows)	Insignificant	Distribute enough insect killers.
			Minor	Provide the adequate amount of insect killers and distribute efficiently. Provide/Repair wire mesh screens for all windows.
			Moderate	Provide/Repair/ Replace wire mesh screens for all windows. Provide/Repair/ Replace insect killers wherever needed or missing.
			Major	Identify harming kinds of pests and insects to provide chemicals along with insect killers and wire mesh for all windows.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
			Fatal	Empty property temporarily until problem is solved, and ask for authorities help related to pest control. Chemicals to be used as well as insect killers and wire mesh for all windows. Transfer workers to an alternative facility/dorm.
		- Control over existence of stray animals within facility (surveillance and frequent inspection/ self-closing devices for doors).	Insignificant	Surveillance over the existence of stray animals within facility.
			Minor	Ensure all doors/windows are maintained closed/secured. Facility to be kept clean (no food left-overs scattered on grounds) in order not attract stray animals.
			Moderate	Provide self-closing devices over all main access doors. Surveillance cameras provided/monitored. Raise awareness between workers using the facility about the potential danger of having stray animals within facility. Frequent cleaning.
			Major	Inform authorities to help with the stray animals control. Surveillance cameras to be installed and monitored. Raise awareness between workers. Keep facility clean. Secure Windows and Doors. Provide doors with self-closing devices and ensure openings are kept closed. Frequent maintenance and inspection of vertical shafts (to be enclosed and secured, preventing any stray animal to enter or live within)
			Fatal	Empty property temporarily until problem is solved (transfer workers to an alternative facility/dorm), and ask for authorities help related to stray animals control. Secured shafts, windows, and doors with self-closing mechanisms (Ensure maintained closed). Install cameras to monitor any similar incident in the future.

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
		- First-aid boxes distribution with medicaments provided.	Insignificant	Properly Fixe/Distribute First-Aid boxes efficiently and ensure all the needed medicines are provided within.
			Minor	Secure/Provide/Repair/Replace First Aid boxes. Distribute sufficiently and ensure all the needed medicines are provided within.
			Moderate	Secure/Provide/Repair/Replace First Aid boxes. Distribute sufficiently and ensure all the needed medicines are provided within.
			Major	Install first aid boxes wherever needed and provide with all the needed medicines within.
			Fatal	Not applicable.
		- Trash collecting area and adequate distribution of trash bins provided. - A waste basket of proper size at each toilet. - Self-closing plastic containers to be used for waste collection. - Each floor must be provided with one container or more for solid waste (3 liters per worker). - Trash must be emptied at least once a day.	Insignificant	Empty frequently
			Minor	Ensure all trash bins used are of plastic self-closing type. Empty frequently
			Moderate	Provide adequate number of trash bins and of approved type. To be empties upon approved schedule.
			Major	Not Applicable
			Fatal	Not Applicable

Discipline/Subject of Assessment	Reference Code/ Standard	Typical Defect Identified	Defect Classification	Corrective Action Suggested
		- Providing clean wet areas with all the needed sanitary fixtures, fittings, and accessories in good working conditions.	Insignificant	Keep wet areas clean and ensure proper use of fixtures and fittings
			Minor	Frequent cleaning and replacement or repair of damaged fixtures or fittings.
			Moderate	Frequent cleaning and maintenance works. Replacement of damaged fixtures. Repair works for leakage in networks.
			Major	Repair works that may pertain demolishing of finishes and further maintenance and repair works including affected surrounding finishes, electrical networks, or structural elements. Evacuate damaged areas for a certain period.
			Fatal	Not Applicable

Note

Corrective actions suggested are based on technical experience of the assigned team of engineers and related to what was observed, investigated, and analyzed during Inspection visits. Further inspection and assessment visits might be needed by professional members and craftsmen or contractors to ensure applicability of corrective actions suggested (or suggest further improvements) and to define budget needed for the recommended corrective actions and improvements related to the structural integrity of existing dormitories.

8. Responsibility against Corrective Actions

As illustrated in the proceeding table titled "Guidance for assessment and repair of Typical defects", the identified typical defects can be classified into 4 groups based on the severity of their impacts as follows: FATAL, MAJOR, MODERATE, MINOR, and INSIGNIFICANT. Colour coding is given to highlight these 4 categories (See the figure to the right). This colour coding will make it easier for executives to point out major issues that needs to be tackled and help set an implementation plan with prioritization for the corrective actions needed, with relevance to the severity of defects, jeopardizing the safety and the health of the workers living in dormitories.

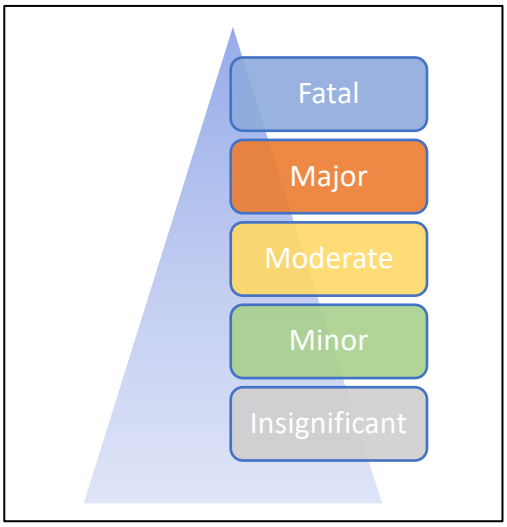


Figure 8-1: Risk categorization

And in order to guarantee continual improvement to the HSE management, an internal responsibility system (IRS) should be applied to maintain the structural integrity within any dormitory, and raise the awareness towards a safety culture between Workers, Employers, Employees and Supervisors and an assigned OSH committee, following the IRS procedures as illustrated in the following figure.

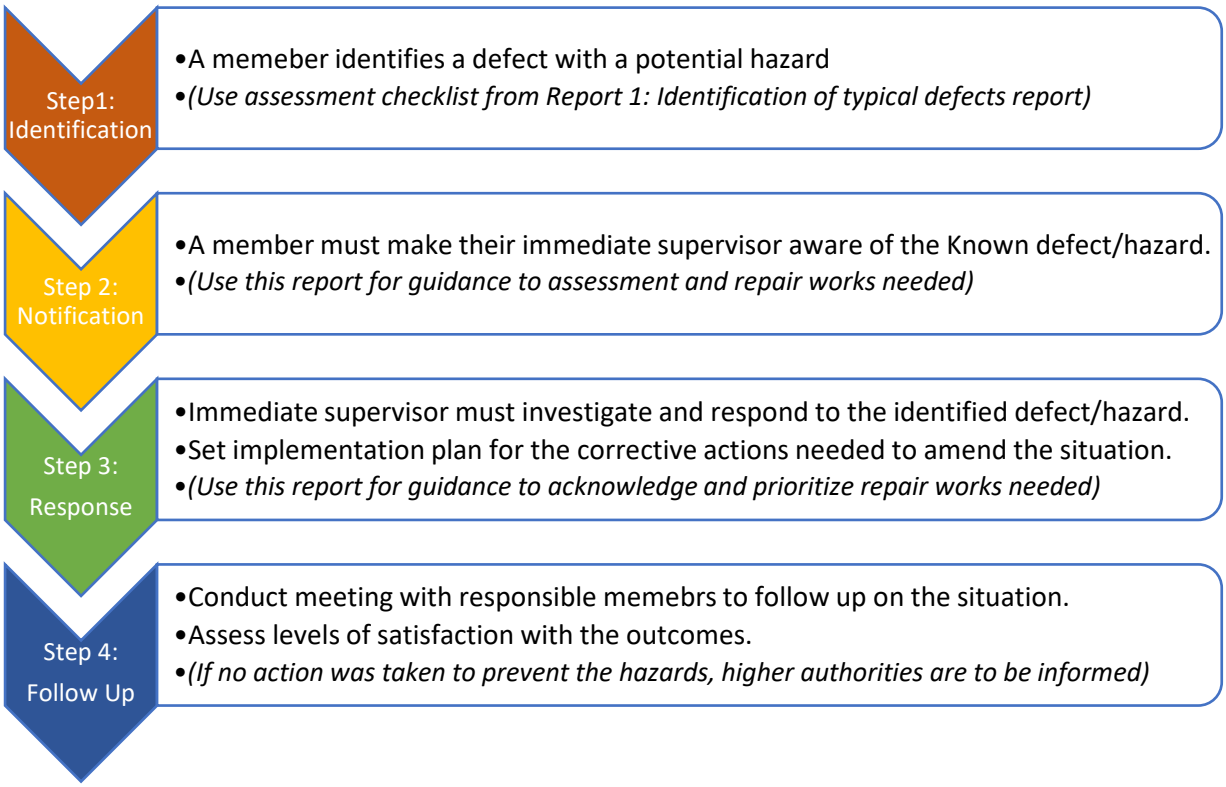


Figure 8-2: Internal Responsibility System Procedures related to OSH

After completing the assessment of the typical defects illustrated in this report, inspector should gather the inspection data, and review the table provided in this report as guidance to assessment and repair of typical defects, to identify corrective actions needed with relevance to the severity of the defect and its accompanied risks. This data can be reorganized using the following suggested template to help inspectors brief their assessment outcomes and help executives understand and prioritize mitigation procedures needed.

Table 4: Suggested Template for Briefing Assessment Outcomes and Amendments Required

Risk Categorization	Defect Identified (*)	Corrective Action Needed (**)	Cost Estimate (***)	Estimated Duration for implementing repairs (***)	Notes/ Challenges/ Consequences (****)
Fatal	Defect 1	Action 1			
	Defect 2	Action 2			
Major					(*****)
Moderate					
Minor					
Insignificant					

(*) In this field inspector should list the identified defects under each category with relevance to the expected severity of accompanied risk.

(**) In this field inspector should List the corrective actions suggested, as derived from the table titled "guidance for assessment and repair of defects"

(***) Executives or responsible assigned members should conduct meetings with professionals/engineers/contractors to set an estimated duration and budget for repairs.

(****) Executives or responsible assigned members should list obstacles or foreseen challenges against mitigation procedures needed, such as difficulties faced when temporary building evacuation is needed…etc

(*****) The number of sills/ rows should match the number of identified typical defects under each risk category.

Enhancing the Structural Integrity of Dormitory Buildings in Jordan's Garment Sector- Phase II

Annex A

List of References

Reference Number	Reference Code Name/ Section Number	Subject of Inspection	Assessment measure addressed
RI	Jordan National Building Code (MoPWH)- Space Requirements in Buildings Code	Space/ Room Requirements and qualities	General conditions affecting all measures
RII	Jordan National Building Code (MoPWH) (2002)- Water Insulation and humidity in Buildings Code	Water insulation and humidity levels	
R1	Jordanian National Building Code- Earthquake Resistant Buildings.	Regularity of the structure and resisting of seismic loading	Structural Integrity
R2	International) Uniform Building Code (UBC 1997).		
R3	Jordanian Code of Loads and Forces, 2006.	All loads on structures and minimum loading as per the function	
R4	Jordanian Code for Plain and Reinforced Concrete JBC5-93 (All Parts).	The design of the reinforced concrete structures and the serviceability	
R5	(International) Building Code Requirements for Structural Concrete ACI 318M-19.		
R6	(International) British Standard- Structural use of concrete - BS 8110.		
R7	Jordanian Code for Steel Structures	Steel structures design	
R8	The Handbook of Repair and Rehabilitation of RCC Buildings. Published by: Director General (Works), Central Public Works Department, Government of India, Nirman Bhawan, 2002.	Rehabilitation and retrofitting	
R9	Jordanian local Earthing and Lightning code.	Earthing and lightning systems	Electrical Safety
R10	British standards (BS 7430 Code of Practice for Earthing).		
R11	Jordanian local Electrical Installation code.	Electrical installation "cables, socket outlet "	
R12	International Electrotechnical Commission (IEC).		
R13	British standards (BS7671 Requirements for electrical installations. IEE Wiring Regulations. Seventeenth edition).		
R14	CIBSE 2012 SLL CODE FOR LIGHITING	Lighting system "recommended lux level and the IP (Ingress Protection) rating of a bulb or light fixture	
R15	British standards (BS526 Code of Practice for Emergency Lighting).		

Reference Number	Reference Code Name/ Section Number	Subject of Inspection	Assessment measure addressed
R16	Jordanian Fire Protection Code 2004	Architectural applications and Interior conditions with relevance to precautional measures taken against fire hazards	Fire Safety
R17	Fire Detection and Fire Alarm System/ Jordan National Building Council/2004	MEP systems precautional applications against fire hazards	
R18	NFPA 72/ National Fire Alarm and Signalling Code/2019		
R19	BS 5839-1/ Fire Detection and Fire Alarm System for Building/2017		
R20	Jordanian Firefighting Code		
R21	Jordanian Fire Protection Code		
R22	NFPA 10 and NFPA14/ Standard for the Installation of Standpipe and Hose System		
R23	Boiler Workbook provided by BWJ		
R24	Comprehensive guide - MoL - Work procedures for safety and health prevention measures to limit the spread of the corona virus: Applying the standard work procedures manual for textile and apparel manufacturing establishments and companies in development zones and qualified industrial zones	Architectural applications and Interior conditions with relevance to compliance to public health minimum requirements	Public Health
R25	Dormitories Inspection/Assessment Guide 2019 (by Jordanian MoL, MoH, BWJ)		
R26	The Public Health Law		
R27	Uniform plumbing code/ 2018	MEP systems applications and operational conditions with relevance to compliance to public health minimum requirements	
R28	ASHRAE standard/ 2009		
R29	Jordanian code for gas system installation in buildings		
R30	Jordanian National Building Codes (Space requirements in buildings code, Natural ventilation and Health Assets code, Natural Light code)		