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INTRODUCTION

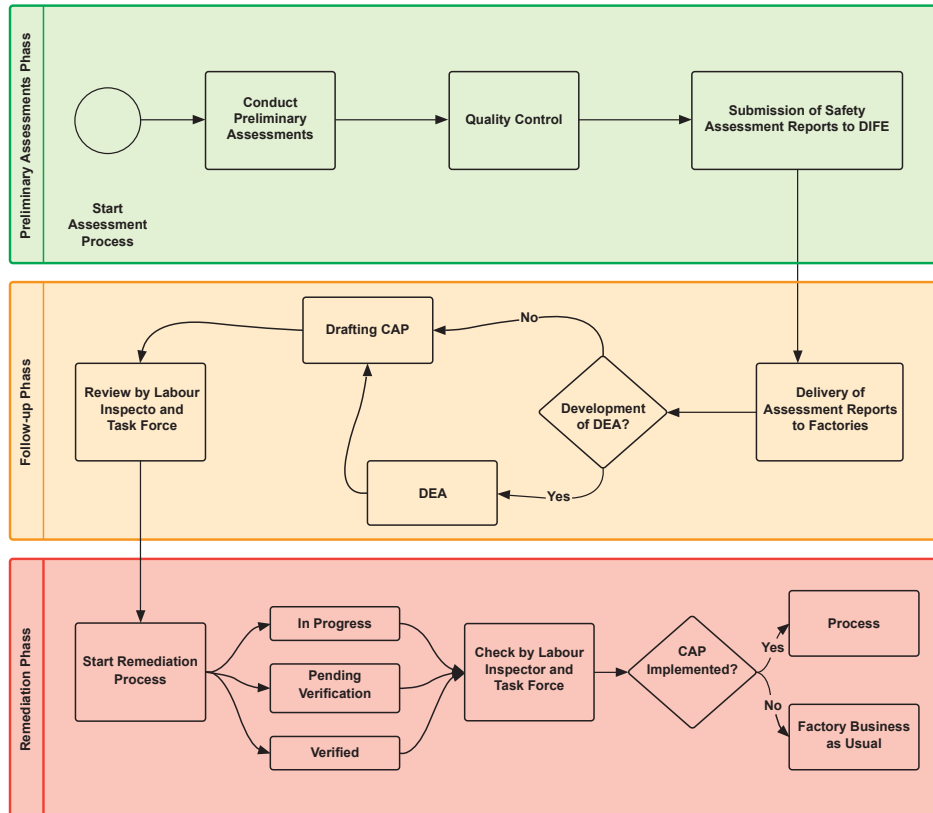
Following the Tazreen Fashions fire and Rana Plaza collapse, the Government of Bangladesh along with employers and workers organisations, brands and retailers, as well as the International Labour Organization (ILO) agreed that efforts must be made to ensure safety in all export-oriented RMG factories. As part of this process inspections for structural, electrical and fire safety have been carried out. A follow up phase during which inspection recommendations are planned and implemented is now underway.

The Department of Inspection for Factories and Establishments (DIFE) is a department under the Ministry of Labour and Employment responsible for ensuring the welfare, safety and health of workers in various sectors. DIFE, assisted by ILO, is undertaking the National Initiative for Structural, Fire and Electrical Safety in the RMG sector.

PROCEDURE

Preliminary Assessment Phase

This phase is over and it is likely that factories have been inspected for structural, fire and electrical safety. This phase included actual surveys of factory/factories and issuing of assessment reports.



Follow-Up Phase

This phase begins directly after the issue of safety reports to factories. In this phase, factory owners are expected to understand the current safety status of their factories and create a Corrective Action Plan (CAP) using a template provided, based on recommendations given in the structural, fire and electrical safety reports. Factory owners will liaise with their assigned Labour Inspectors to have CAPs approved, before progressing onto the next phase.

Remediation Phase

Remediation work can begin as soon as the CAP is approved by the Task Force. The Labour Inspectors will be responsible to communicate this final approval and to monitor the progress of the CAP. The factory's engineer is required to provide a 'sign-off' at the end of the remediation phase, confirming that all work has been undertaken in accordance with the approved CAP.

PRELIMINARY ASSESSMENT PHASE

The structural, electrical and fire safety assessments are carried out in this preliminary assessment phase. Structural, fire and electrical assessment reports have been prepared by technical consultants of fire and electrical safety which highlight the remedial action needed to improve the safety of factories.

As the content of the reports is of a technical nature factory owners/managers should discuss them with building, fire and electrical engineers, who will be able to explain the content of the report. A glossary of terms is also available which can be used to explain a number of technical terms used in the report.

The Preliminary Assessment Phase ended in December 2015.

FOLLOW-UP PHASE

The Follow-Up phase begins with the receipt of assessment reports by factory owners/factory managers. During this phase, owners/managers must take responsibility to improve the safety of their own factories, using the report as guidance.

During this phase owners/managers are expected to:

- Read and comprehend the content of the Safety Reports.
- Ask any questions and liaise with Labour Inspectors to clarify any doubts.
- If a Detailed Engineering Assessment (DEA) is required – submit a quote and/ or a plan to carry out a DEA to a Labour Inspector within 6 weeks of receiving the report.
- If a DEA is not required – submit a CAP to a Labour Inspector within 2 weeks of receiving the report.
- Take a pro-active approach to improving the safety of their factories by implementing simple remedial actions that could be done immediately. Examples of remedial actions that owners can carry out by themselves are in the following section (Remediation Phase).

The Task Force

DIFE has created a technical team, called the Task Force, who will assess your DEA and/ or CAP submissions and either approve them or make suggestions for their improvement.

What is a DEA?

Detailed Engineering Assessment (DEA) is recommended when there is insufficient information available to confirm the structural integrity of the building. The recommendation from the findings of the DEA will be incorporated into the structural CAP.

Once a DEA is approved

During the process of approving the DEA, the Task Force will engage with factory owners/managers to discuss each of the remedial options presented by the DEA. The owner will then decide which of the remedial options to choose, based on the needs and requirements of the factory. This decision will be documented at the end of the DEA approval process.

What is a CAP?

A Corrective Action Plan (CAP) is to be developed by factory owners/managers in conjunction with structural, fire and electrical engineers that the owner/manager needs to engage. DIFE will provide owners/managers with a CAP template, along with the safety reports. This CAP template includes a list of observations and recommendations to improve the safety of the factory. It will then be the owners/managers responsibility (with the help of the engineer) to respond and provide an action plan to comply with the recommended actions.

The purpose of the CAP is to detail the necessary actions needed to resolve safety issues as well as to be used by DIFE to make sure that these corrective actions are taken within the recommended time period.

Once the CAP is approved

Owners will be advised once the CAP is approved. Only when the CAP is approved can the remediation process commence.

DIFE will employ the Task Force to monitor the progress of the remediation process and provide advice as necessary.



REMEDIATION PHASE

This is the implementation phase of the CAP which has been approved by DIFE. During this phase, owners are responsible for:

- Planning and undertaking the CAP for all structural, fire and electrical components. This may involve careful planning, temporary relocation or temporary closure of the factory production to enable the remedial actions to be carried out.
- Liaise with a DEA consultant and building engineer (structural, fire and electrical engineers) to monitor progress.
- Liaise with DIFE Labour Inspectors to provide an update on progress.
- At the completion of the Remediation Phase, obtain a 'sign off' from a DEA consultant and/ or building engineer to confirm that the corrective actions were carried out in accordance with the approved CAP.



Implementation of corrective actions before the CAP

Owners may want to take corrective action as soon as possible. **Here is a list of simple things they can implement immediately before the CAP:**

- Removing unnecessary wastage from the factory.
- Relocating heavy storage items to the ground floor level (if you are not a green building as per structure safety assessment).
- If storage is retained on upper floor levels, limit the height of storage as per recommendations given in the structural safety report.
- Ensure all means of escape route (corridors, passages exit doors, stairs) are clear from any obstructions.
- Remove all locks from the exit doors and ensure that doors at the exits can be opened without a key from inside.
- Ensure proper separation of loose and packed storage combustible material from heat sources.
- Ensure all emergency lighting is operational and install proper evacuation signage if there is none.
- Avoid overloading circuits.
- To avoid short circuiting remove: loose contacts and temporary connections, live wires, partially or fully damaged switches and sockets, dust from the electrical boxes.
- Install proper fuse and/or circuit breaker and connect

all metal parts of the building to the ground.

- Thorough checking of the electrical lines by a properly trained electrician.
- Check that portable extinguishers are suitably located and maintained properly and regularly.
- Removed unwanted combustible material and dust from high risk areas (generator, boiler, compressor transformer room).
- Implement fire safety management plans and exercise fire drills.
- Turn off non-essential electrical equipment at the end of each working day.

For other corrective actions that are recommended within the safety reports, it is strongly suggested that owners do not take actions without gaining approval from DIFE. This is to prevent them from carrying out incorrect actions, which may result in spending money unnecessarily.

Engaging workers

Owners/managers can inform workers about necessary actions to take in order to improve the safety of factories in many ways. The better informed workers are, the easier it is to gain their participation in ensuring a safer working environment. Here are some ideas on how to inform and engage workers:

- Hold a workshop with all the workers, relaying critical information from the safety reports. Owners/managers can also inform workers on immediate actions that can be taken (as described above) so that they can participate in implementing them.
- Once a CAP is approved, hold another workshop to explain how management plans to implement the recommendations from the Safety Reports.
- Make available a hard copy of the Safety Reports so that the workers can peruse and read this report in their own time.
- Inform workers to access the DIFE website where a summary report of the factory assessments are available to the general public.
- As a general practice, workers change/extend electrical lines as they need to in their day to day work. Ensure that only trained electricians do this.

EXAMPLES OF NON-COMPLIANCE

Structural

Issue – Excessive floor loading from material storage, fabric wastage, boxes etc.

Possible solution – Move all heavy storage to ground floor, remove fabric wastage from any areas within the factory and limit temporary boxes/ storage to the recommended weight limit.

Issue – Unauthorised building extension: DEA is required.

Possible solution – Arrange for a DEA to be completed. Until a DEA is done, management can minimise risk by keeping floor loading to a minimum in the extended part.

Issue – Exposed reinforcement on columns on roof level and lack of waterproofing.

Possible solution – Hire a qualified structural engineer who can advise the correct type of waterproofing to be installed on roof level and how to protect the exposed column correctly.

Fire and Electrical

Issue – Lack of Emergency Action Plan (EAP).

Possible solution – Develop an Emergency Action Plan (EAP) and train employees in its use.

Issue – Lack of evacuation floor plans and evacuation procedures.

Possible solution – Develop evacuation floor plans and evacuation procedures and ensure that every employee understands the procedure and knows what to do in an emergency.

Issue – Obstructions to means of escape.

Possible solution – Clear all pathways and means of escape routes immediately and maintain housekeeping on a regular basis.

Issue – Non-standard cables and cable connections were used in electrical circuits.

Possible solution – Employ qualified electrical technicians to provide proper cable and cable connections using wires that are compliant with the BNBC.

Issue – Regular testing of electrical insulation of wires, MCB, SDB, electrical equipment, earthing etc. has not been conducted.

Possible solution – Create an Electrical Safety Management Plan to include periodical testing of various electrical elements and carry out the necessary test immediately.

Standards Used For Assessment

1. BNBC 2006
2. NTC Guideline for Assessment of Structural Integrity, Fire and Electrical Safety of Existing RMG Factory Buildings in Bangladesh
3. Alliance Standard
4. Accord Standard

Explanation of Structural Terms

Factor of Safety?

Factor of Safety (FOS) is Column Ultimate Strength, divided by the Column Working Stress. These are explained in Table 1.

Load Management?

- Reduce risk of structural distress
- Avoid overloading
- Maintain a loading level that is acceptable
- Achieved through Load Plans
- Load Plans are approved by the Assessment Team
- Each and every factory shall have a Load Plan

Dead Load?

The Dead Load includes:

- Loads that are relatively constant over time
- Weight of the structure itself
- Immovable fixtures such as walls

Live Load?

Live Loads refer to loads that:

- Change over time
- People walking around a building (occupancy)
- Movable objects such as furniture
- Etc

Floor Load Plan (FLP)?

- Floor Load Plan shall document the actual maximum allowable operational loading on each floor.
- Floor Load Plan for each floor shall be permanently and clearly posted on each floor.
- The factory owner shall ensure that the Live Load for which a floor or roof is or has been designed, will not be exceeded during its use.

Each factory shall have an approved **Floor Load Plan** and a **Load Manager**.

Load Management Guidelines

- The approved **Load Plan of a particular floor shall be displayed on the respective floor.**
- **Factory personnel** shall be **trained** to ensure floor live load is within the permissible limit (**Load Manager**).
- **DIFE Inspector** to check load management time to time.

Loads to be considered during floor load planning

The following loads shall be shown in a load plan:

- Machineries, workers, partition walls
- Heavy equipment, e.g. generator, boiler, compressor, transformers etc
- Water tanks
- Storage items including racks
- Decorative items - furniture, cabinet, false ceiling etc.

Other non-structural elements such as:

- Steam pipes, gas pipes
- Chemical or process pipes shall be considered as Live Load during floor load planning

BRIEF ASSESSMENT REPORT:

Structural:

Table 1: Colour codes based on Factor of Safety (FOS) of columns along with required actions to be taken within the timeframe from the date of the structural assessment

Factor of Safety (FOS) of column	Colour codes	Description	Required action	Time frame of action
Below 1.25	Red	Critical visible defects resulting in immediate danger to structure and workers.	Requires careful review. Take actions to increase FOS by reducing load less than the minimum load on any floor, i.e. 1kN/m ² or 20psf. If FOS is still below 1.25, then evacuate the facility immediately considering expert opinion.	Convene Review Panel within 2 days. Start Detailed Engineering Assessment (DEA) immediately.
Between 1.50 and 1.25	Amber	Significant visible defects with no immediate danger to structure or workers.	No reason to suspend operations in the facility. Production may continue subject to agreement to address issues raised and actions prioritized locally in report.	Requires DEA within six weeks
Between 1.86 and 1.5	Yellow	Limited visible defects with no immediate danger to structure or workers.	Production may continue subject to agreement to address issues raised and actions prioritized in report.	Actions and core test within 6 months
Better than 1.86	Green	No critical visible defects or structures and no visible immediate risks to workers.	Generally all clear subject to agreement to address prioritized comments. Production can continue.	No immediate actions required.



Sewing floor:
Typical Load: 1.0~1.5 kN/sq.m



Finished goods storage:
Typical Load : 2.0~2.5 kN/sq.m



Fabric storage:
Typical Load : 3.5~4.0 kN/sq.m



Fabric storage:
Typical Load : 7.5~9.0 kN/sq.m

Fire and Electrical - (Version 1):

Priority fire safety non-conformities are indicated with a colour coding, and action time frames given for implementing them as suggested by the ILO and may be modified by the National Tripartite Committee (NTC) as deemed necessary:

Description	Colour Code	Time Frame
Requiring immediate attention; the factory should not continue to be occupied until these non-conformities have been rectified		Immediately
The remedial works indicated must be carried out within a period of 6 weeks to reduce the life safety risk in the short term		6 weeks
The remedial works indicated must be carried out within a period of 6 months to reduce the life safety risk in the medium term		6 months
Actions that must be incorporated into a Fire Safety Management Plan immediately and should be a regular activity		On-going

Non-conformities and the colour-coded time frame for required action: The table below is an abridged version of the original table provided in the assessment report which includes the BNBC Code, NTC Guidelines and the time frame for action. The term “Standard” in the Table corresponds to the Standard set in the BNBC.

Item	Type of Non-Conformities	Actions
Type of Construction	<ul style="list-style-type: none"> Steel or temporary structure not conforming to Type-I construction on roof-top of building more than 4 storied high 	<ul style="list-style-type: none"> Remove temporary structure from roof top
Mixed Occupancy	<ul style="list-style-type: none"> Inadequate horizontal separation Inadequate vertical separation 	<ul style="list-style-type: none"> Provide design drawings to demonstrate how designated storage areas, assembly areas, offices and work areas should be separated with fire-rated walls and doors according to the Standard. Retrofitting of internal layout needed with appropriate drawings following Standard. Mixed use buildings and buildings housing RMG factories, use some floors that fall under “Mixed Occupancy” (e.g. storage, office, work areas, etc.). The designated storage areas, assembly areas, offices and work areas should be separated according to the Standard. Different occupancy on different floors should be separated with fire-rated construction according to the Standard.
Vertical Propagation of Fire	<ul style="list-style-type: none"> Protection against propagation of fire through voids in interior and exterior walls not equivalent to the fire resistance rating of the wall 	<ul style="list-style-type: none"> Retrofitting drawing of internal layout needed according to the Standard. Provide fire-rated separation to prevent smoke and fire propagation through staircases and grills on the interior walls.

Item	Type of Non-Conformities	Actions
Exit Components: – Exit Door – Corridor – Passageways – Aisles	<ul style="list-style-type: none"> • Door width less than minimum (1.0m) • Sum of the widths of doors less than required • Doors do not swing outwards • Corridor and passageways width less than minimum 	<ul style="list-style-type: none"> • Provide drawings to arrange adequate number of doorways at each floor according to the Standard and produce the plan for construction of these doorways.
	<ul style="list-style-type: none"> • Door width less than minimum (0.9m) • No handrail although level difference between two adjacent floors exceeds 0.75m 	<ul style="list-style-type: none"> • Doors on all escape routes to open in the direction of travel. • Ensure adequate number of doorways on each floor according to the occupant load of the Standard. • Internal retrofitting needed to create safe passage, corridors and exits according to the Standard.
		<ul style="list-style-type: none"> • Keep corridors and passageways on escape routes free of any obstructions to ensure unobstructed path of travel along the aisles, corridors, and passageways to the exits. • Relocate work benches and temporary storage in such a way that corridors, passageways and aisles are at least 1.0m wide on all escape routes.
Floor Occupancy Load	<ul style="list-style-type: none"> • Floor occupancy more than allowed 	<ul style="list-style-type: none"> • Provide floor plans with equipment, worker and work space arrangements to ensure appropriate occupancy load as per the standard.
	<ul style="list-style-type: none"> • Space per occupant less than required 	<ul style="list-style-type: none"> • Ensure appropriate workspace for the occupant load of each floor as per the Standard. • Change layout of workstations to ensure allowable occupancy load according to the Standard.
Travel Distance	<ul style="list-style-type: none"> • For a floor with one exit: The travel distance is more than 23m • For a floor with two or more exits: The travel distance is more than 45m 	<ul style="list-style-type: none"> • Provide drawings and plans to modify the travel path to reduce travel distance to ensure adherence to the Standard.
	<ul style="list-style-type: none"> • Travel distance more than allowed for one exit (60m) in an RMG factory equipped with automated fire detection and alarm system and standpipe hose system • Travel distance more than allowed for one exit (122m) for an existing RMG factory building covered entirely with automated sprinkler system along with appropriate warning system and portable fire extinguishers • Travel distance exceeds the allowed distance for floor with more than one exit 	<ul style="list-style-type: none"> • Change layout of workstations to achieve desired travel distance. • Implement modifications of the floor plans to ensure appropriate length of travel according to the Standard.
Vertical Shaft	<ul style="list-style-type: none"> • Openings not protected by enclosures of required fire resistance rating • Electrical cables do not run through separate service ducts • Not sealed with noncombustible material at each floor level for electrical services duct 	<ul style="list-style-type: none"> • Ensure prevention of fire and smoke propagation through vertical shafts by providing fire rated enclosures around the openings along with seals in shafts and ducts at floor separations. • Provide service duct for electrical cables. • Seal the shafts in the floors when not needed. • Seal the shaft with non combustibile materials at each floor.

Item	Type of Non-Conformities	Actions
Staircases/ Stairways	<ul style="list-style-type: none"> • Interior staircase not protected through smoke-proof enclosures • Exterior staircase susceptible to fire and smoke propagating through wall openings • Open grills in walls between staircase and floor spaces • The ground floor exits not enclosed • Stairways not continuous from roof to the final exit • Stair width less than required • Sum of stairway widths less than required for maximum occupant load • Tread width less than required • Riser height more than required • Riser & trade tolerance of a flight not within limit • Max number of steps in a single flight more than 15 • Landing dimension less than stair width • Handrails height less than required • Number of handrails less than required • Stairway door not fire door • Swinging of door constricts the width of the corridor below 0.9m • Height of exit doorway less than required • No auto door closer • Clear head room less than required • Obstruction in stairway 	<ul style="list-style-type: none"> • Produce design drawings to demonstrate how stairways are to be of adequate dimensions and appropriate specifications and to be converted into smoke-proof enclosures equipped with fire-rated side swinging doors opening in the direction of travel at each floor.
		<ul style="list-style-type: none"> • Convert all interior stairways into smoke-proof enclosures equipped with fire-rated side swinging doors opening in the direction of travel at each floor. • Close wall openings adjacent to the exterior staircases to prevent fire and smoke propagation. • The ground floor exits should be enclosed so as to ensure safe pathway for escape from the premises. • Provide continuous smoke-proof fire protected pathway along all the stairways from roof to the final exit. • Provide stairways of adequate dimensions and of appropriate specifications according to the guidelines as required for the occupancy load. • Remove all collapsible security gates and roller shutters from all exit stairway access doors. • Remove sliding doors from all final exits. Where sliding doors are provided at final exits, these shall not be relied on for means of exit.
		<ul style="list-style-type: none"> • Remove obstructions from stairways.
Storage	<ul style="list-style-type: none"> • No fire door. • No/Improperly illuminated exit sign • Tortuous and obstructed travel path • Absence of proper separation using fire rated walls and doors • Width of passageway less than required <hr/> <ul style="list-style-type: none"> • Clearance from ceiling less than 1/3rd of ceiling height • Naked lights in storage • Others same as above (except ceiling height) 	<ul style="list-style-type: none"> • Provide easily identifiable escape routes, clear and free of obstruction. • Provide clearly visible illuminated exit sign to indicate exit from storage area. • Provide cover on naked light.
		<ul style="list-style-type: none"> • Provide fire doors as approved by the guidelines. • Provide fire-rated solid walls from floor to ceiling to ensure fire separation of the storage area from others or maintaining proper storage size and distance between stored items according to the Standard.
		<ul style="list-style-type: none"> • Rearrange storage items to ensure proper clearance from ceiling.

Item	Type of Non-Conformities	Actions
Lifts & Enclosures	<ul style="list-style-type: none"> • Lift lobby not enclosed and without fire door • No fire switch • Inappropriate fire resistance rated lift car door • No rules posted for use during fire 	<ul style="list-style-type: none"> • Provide enclosed lift lobby with fire door as part of the stair enclosure as specified in the Standard. • Provide appropriate lift fire-rated door and fire switch. • Remove collapsible gate on lift door at all levels.
		<ul style="list-style-type: none"> • Post emergency procedure notices in lift lobbies. • Remove obstructions from lift lobby.
Fire Lifts	<ul style="list-style-type: none"> • No fire lift in building • No lift lobby enclosure • No fire rating on lift car door • Capacity less than required • Speed less than required • Two-button switch absent • Two-way voice communication absent • Separate power supply absent 	<ul style="list-style-type: none"> • Provide drawings and plans for installation of fire lift as per the specifications provided in the guidelines.
		<ul style="list-style-type: none"> • Provide fire lift in building matching the specifications provided in the guidelines.
Signs & Illumination	<ul style="list-style-type: none"> • Exit sign missing or not clearly visible • Exit signs not illuminated at all times • Means of exits not signposted • Directional signs missing • No Bangla and English exit instructions in case of emergency • No Bangla signs for lifts and stairs • Means of escape lack emergency lighting 	<ul style="list-style-type: none"> • Provide adequate number and type of illuminated exit signs so that exits can be seen from all corridors and evacuation paths. • Remove and replace incorrect directional signs. • Provide English and Bangla exit instructions where necessary. • Post directional signs at appropriate locations.
		<ul style="list-style-type: none"> • Provide new emergency lighting system that meets the specified emergency lighting requirements of the guidelines.
Basement	<ul style="list-style-type: none"> • Basement staircase is not enclosed with materials of 2-hour fire resistance 	<ul style="list-style-type: none"> • Produce design drawings to demonstrate the incorporation of a fire-rated construction with smoke-proof enclosure from roof to ceiling with vestibule separation from basement or by other provisions provided in the guidelines.
	<ul style="list-style-type: none"> • Basement, ground floor and high risk areas are not separated from the stairways by smoke proof enclosures • Vestibules are not provided in storage areas or high risk areas which open directly into smoke proof stairways 	<ul style="list-style-type: none"> • Enclose basement stairs with a fire-rated construction with smoke-proof enclosure from roof to ceiling with vestibule separation from basement or by other provisions provided in the guidelines. • Install fire-rated self-closing swing doors to the smoke-proof enclosure to prevent the spread of smoke and heat into the stairs.
Command Station	<ul style="list-style-type: none"> • No Command Station • Non-standard Command Station 	<ul style="list-style-type: none"> • Equip Command Station with all facilities required to meet the guidelines requirements.

Item	Type of Non-Conformities	Actions
Fire Drill & Training	<ul style="list-style-type: none"> • Less than 1 time each month • Training of trainers not performed • Less than 4 times a year • Training of trainers not performed 	<ul style="list-style-type: none"> • Ensure adequate number of fire drills as per the guidelines. • Provide training to the trainers. • Include fire drill and training of the trainers in fire safety management plan.
Portable Fire Extinguishers	<ul style="list-style-type: none"> • Inadequate number of extinguishers • Validation certificate not monitored regularly • Extinguishers • Extinguishers not accessible 	<ul style="list-style-type: none"> • Provide fire extinguishers that meet the requirements of the guidelines. • Ensure regular monitoring and maintenance of extinguishers, including inspection and expiry/re-service labels. • Ensure easy accessibility to fire extinguishers.
Standpipe and Hose system	<ul style="list-style-type: none"> • No standpipe & hose system • Supply of water required for fire protection is not adequate • The building premise does not have an overhead and/or underground water tank • Minimum pressure in the standpipe is less than required • The size (diameter) of the standpipe is less than the prescribed value • No Siamese connection available 	<ul style="list-style-type: none"> • Provide standard standpipe & hose system that complies with the guidelines requirements for supply of water, minimum pressure in the standpipe and size (diameter) of the standpipe. • Ensure that Siamese connections are available as specified by the guidelines.
Fire Pump	<ul style="list-style-type: none"> • No fire pump present 	<ul style="list-style-type: none"> • Provide fire pump with specifications to meet the guidelines requirements.
Boiler Room	<ul style="list-style-type: none"> • Boiler room is not properly segregated from the rest of the occupancy • No fire rated composite door at the boiler entrance • Inadequate ventilation of the boiler room • No detector 	<ul style="list-style-type: none"> • Produce design drawings to demonstrate the incorporation of fire rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the boiler room. • Provide firefighting equipment as required by the guidelines. • Provide fire-rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the boiler room. • Install appropriate detectors.
Transformer Room	<ul style="list-style-type: none"> • Transformer housed in basement • No separate room for the transformer • Transformer room walls less than 4hr fire resistance • Door having fire resistance rating less than 2hr • No separating wall between switchgears and transformer 	<ul style="list-style-type: none"> • Produce design drawings to demonstrate the incorporation of fire-rated enclosure from floor to ceiling and an approved fire rated self-closing swing door for the transformer room. • Provide firefighting equipment as required by the guidelines. • Provide aligned horn gap. • Replace the silica gel.

Item	Type of Non-Conformities	Actions
Transformer Room	<ul style="list-style-type: none"> Transformer room used for storage of combustible material/junk Transformer inaccessible Horn Gap not properly aligned or not provided Connection without lug No or loose earthing of transformer body Poor illumination in transformer room Inadequate cross ventilation for the transformer room 	<ul style="list-style-type: none"> Provide fire-rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the transformer room. Place transformer in ground floor. Install appropriate detectors. Ensure accessibility, illumination and cross ventilation to transformer. Remove combustible materials/junk from transformer room. Ensure the earthing of transformer body. Ensure secured wiring with lug.
Generator Room	<ul style="list-style-type: none"> Generator located on a higher floor Inadequate ventilation of the generator room The generator room is not properly segregated from the rest of the occupancy No detector in generator room No firefighting equipment is present in the generator room Large volume (>455L) diesel stored inside generator room Combustible materials inside generator room One point frame earthing of generator instead of two No over current or earth fault protection provided No cover on the cable trench 	<ul style="list-style-type: none"> Produce design drawings to demonstrate the incorporation of fire rated enclosure from floor to ceiling and an approved fire rated self-closing swing door for the generator room. Provide firefighting equipment as required by the guidelines. Provide over current and earth fault protection. Provide fire-rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the generator room. Install large-volume diesel storage tank with appropriate separation. Install generator on the ground floor. Install appropriate detectors. Remove combustible materials from generator room. Ensure accessibility and ventilation to generator. Ensure double earthing of generator frame. Provide cover on the cable trench.
Substation	<ul style="list-style-type: none"> Access to substation not easy Ventilation and illumination of substation is poor Panel door damaged/not present No clear identification mark on distribution panel No instruction for first aid to electrical shock and artificial respiration Non-conductor mat not provided/insufficient Electric cables do not pass through service shaft or insulated conduits Burning sign inside panel Loose cabling or connection without lug 	<ul style="list-style-type: none"> Provide easy access to the substation. Produce design drawings to demonstrate the incorporation of fire-rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the substation room. Ensure earthing of panel body & door with fitted condition. Provide clear identification mark on distribution panel. Identify cause of burning inside panel and take remedial measures. Provide fire-rated enclosure from floor to ceiling and an approved fire-rated self-closing swing door for the substation room. Place substation on ground floor. Install appropriate detectors. Remove combustible materials from substation. Ensure accessibility and ventilation to substation. Provide instructions for first aid and artificial respiration from exposure to electrical shock. Provide cover on the cable trench and rubber mat in front of the panel. Ensure well-dressed cabling with lugs.

Item	Type of Non-Conformities	Actions
MDB/SDB/SB/ MCCB	<ul style="list-style-type: none"> Panel door damaged/not present No instruction for first aid to electrical shock Access obstructed/barred Cable ends not properly soldered or crimped Visible burn marks Connection without lug Undressed messy wire inside Body & door not earthed No clear identification mark on distribution board MDB/SDB/SB or MCB installed on the wooden board Live parts of machine or equipment exposed 	<ul style="list-style-type: none"> Repair broken/loose MCCB/MCB box. Provide duplicate earth leads. Provide earthing to body & door. Provide earth bar/neutral bar Identify cause of burning inside distribution box and take remedial measures Provide clear identification mark on distribution board. Install MDB/SDB/SB or MCB on metal board.
Wiring/Cabling	<ul style="list-style-type: none"> Electric cables do not pass through service shaft or insulated conduits Connections without lug Undressed messy wiring/cables Cable ends not properly soldered or crimped 	<ul style="list-style-type: none"> Provide service ducts or insulated conduits. Ensure secured connections with lug. Replace undressed messy wiring/cables. Properly solder cable ends.
Lightning Protection	<ul style="list-style-type: none"> Lightning protection system not available 	<ul style="list-style-type: none"> Provide appropriate lightning protection system.
Fire Detection & Alarm System	<ul style="list-style-type: none"> Non-standard fire alarm system No fire alarm system Non-standard detectors No detectors 	<ul style="list-style-type: none"> Provide design drawings for the fire detection and alarm system in accordance with the guideline requirements and hazard situation, (with appropriate specifications and drawings) showing how they will be implemented along with implementation plan.

Note 1: The term “Standard” in the above table corresponds to the Standard set in the BNBC.

Fire and Electrical - (Version 2):

Electrical

During the second phase of the National Initiative safety inspection, building electrical systems were assessed against 74 checkpoints to form an opinion regarding the level of compliance with respect to the NTPA building assessment guideline for existing RMG factories.

The checkpoints are categorized as below, based on the timeline of implementation and the risk they possess.

Sr. No.	Priority Levels	Implementation timelines
1	Immediate	The facility should not continue to be occupied until these non-compliances have been rectified
2	1 Week	Action must be incorporated into an electrical safety management plan in 1 week
3	6 Weeks	Action (remedy work indicated) must be carried out within 6 weeks
4	6 Months	Action (remedy work indicated) must be carried out within 6 months
5	Ongoing	Ongoing activity - factory to implement ongoing periodic inspections for these checkpoints
6	Compliant	Guideline requirement is generally compliant
7	N/A	Checkpoint not applicable to the factory

Non-conformities and colour-coded timeframe for required action:

Category	Sl. No	Observations	Code Reference (RMG-NTP)	Timeline for resolution
Documentation	1	Does the facility have updated electrical single line diagram?	RMG- 4.4.9	6 weeks
Documentation	2	Does the facility have updated 'As built electrical layout drawings' (Showing outlets for light, fan, appliances, motors, etc.)?	RMG- 4.4.9	6 weeks
Substation	3	Does the factory have proper approvals for substation and connected load from relevant authority?	RMG - 4.6	6 weeks
Substation	4	Is substation located on the lowest floor, above ground, with direct access from street for maintenance?	RMG-4.6.1	6 months
Substation	5	Arrangements made for preventing storm water from entering transformer/switch room/substation areas?	RMG-4.6.2	6 months
Substation	6	Are the substation/transformer located in a well separated area and having proper working clearance around main boards?	RMG-4.16.7.1	6 months
Substation	7	Is the transformer room and substation area compliant with minimum area requirements mentioned in RMG guidelines table 4.3?	RMG-4.6.1 Table-4.3	6 months
Substation	8	Are accessories of transformers like breathers, vent pipe, buchholz relay, silica gel etc. are in working condition and properly maintained?	RMG-4.16.7.1	6 weeks
Substation	9	Are soak pits provided for transformers having large oil content (more than 2000 liters)?	RMG-4.6.1	6 weeks
Substation	10	Sufficient height of transformer room/substation? (should be more than 3.6 meters)	RMG-4.6.1	6 months
Substation	11	Adequacy of ventilation in substation/generator room? Comment on provision for cross-ventilation.	RMG-4.16.7.1 & 4.9.3	6 weeks
Substation	12	Adequacy illumination in substation/generator room? Comment on non-working fixtures.	RMG-4.8.1	6 weeks
Substation	13	Are there any unwanted materials stored inside the transformer/generator room?	RMG-4.16.7.1	6 weeks
Substation	14	Are there rubber mats provided in front of all distribution boards?	RMG-4.16.7.1	6 weeks
Substation	15	Is there any leakage in wet transformers observed?	RMG-4.16.7.1	1 week
Substation	16	Is there fire protection provided (fire extinguisher and smoke detector) in substation and generator room?	RMG-4.16.7.1	6 weeks
Substation	17	Is the number of changeover switches adequate and with interlocking capabilities?	RMG-4.7.1 & 4.9.4	6 weeks
Substation	18	Is fire-rated wall and fire door available in case of substation/generator room located inside the production building?	RMG-3.7.10	6 months

Category	Sl. No	Observations	Code Reference (RMG-NTP)	Timeline for resolution
Substation	19	Are all incoming and outgoing circuits of HT and LT panels clearly and permanently labeled with identifications numbers and name?	RMG-4.16.7.1	6 weeks
Substation	20	Is there adequate signage of electrical danger/caution at substation?	RMG-4.8.3	6 weeks
Substation	21	Is there a cover provided on cable trench in substation room?	RMG-4.16.7.1	6 months
Generator	22	Is the generator room suitably located (preferably adjacent to substation room)?	RMG-4.9.3	6 months
Generator	23	Is the generator room area compliant with minimum area requirements mentioned in RMG guidelines table 4.4?	RMG-4.9.3 Table-4.4	6 months
Generator	24	Is the generator located in with proper working clearance and easy access for maintenance?	RMG-4.9.3	6 months
Generator	25	Is generator oil stored away from control panels in generator room?	RMG-4.9.3	1 week
Electrical distribution system	26	Are EXIT signages properly illuminated and provided with at least 30 minutes of power backup?	RMG-4.13.2	6 weeks
Electrical distribution system	27	Is there proper segregation of different end used loads (lighting/plug loads/sewing machine load/fan load /HVAC etc.)?	RMG-4.4.9	6 months
Electrical distribution system	28	Are there adequacies of all types of meters (Ammeter, Voltmeter etc.) at distribution boards (LT/MDB)	RMG-4.16.7.2	6 months
Electrical distribution system	29	Are there dedicated circuits and fuse protection found for sockets/plugs feeding for 15/20A sockets?	RMG-4.4.7	6 weeks
Electrical distribution system	30	Are there cable sockets at cable end provided to stranded cables with cable size area $\geq 6\text{mm}^2$?	RMG-4.4.10.3	1 week
Electrical distribution system	31	Any cable / wire found exposed or open live? Cable ends/sockets have improper connections?	RMG-4.4.10.3	1 week
Electrical distribution system	32	Does the factory have overload protection, isolators and short circuit protection implemented in LT panels? (Check LT Panel only.)	RMG-(4.7.2)(4.10)	Immediate
Electrical distribution system	33	Are main distribution boards (MDBs) suitably located with easy access?	RMG-4.16.7.1	6 weeks

Category	Sl. No	Observations	Code Reference (RMG-NTP)	Timeline for resolution
Electrical distribution system	34	Are electrical service shafts provided in buildings above height of 20 m (6 stories)?	RMG-4.5.1	6 months
Electrical distribution system	35	Are energy meters installed at a convenient height (above 1.5 m) and provided with adequate protection?	RMG-4.7.5	6 months
Electrical distribution system	36	Is there adequate emergency power capacity for essential lighting, one lift, fire pumps etc?	RMG-4.9.1	6 months
Electrical distribution system	37	Are any inflammable materials found surrounding electric circuitry at MDBs/SDBs?	RMG-4.8.1	1 week
Electrical distribution system	38	Is there suitable & non-flammable support on light fittings, esp. in store areas?	RMG-4.4.8	6 weeks
Electrical distribution system	39	In case of switchboards located outside the building/exposed to weather, are they provided with weather-proof outer casing? Include evidence.	RMG-4.8.1	1 week
Electrical distribution system	40	Does the building with all lifts have a standby generator?	RMG-4.9.2	6 months
Electrical distribution system	41	Are the electrical installations away from gas stoves, sinks or within 2.5m of any washing unit and sources of water?	RMG-4.8.1	1 week
Electrical distribution system	42	Is the area around open type switchboards dry and properly ventilated, away from storage batteries and with no exposure to chemical fumes?	RMG-4.8.1	1 week
Electrical distribution system	43	Is there insulated support provided for high overhead service entries?	RMG-4.4.12	6 weeks
Electrical distribution system	44	Are there any steam/heat source pipelines passing nearby electrical cables?	RMG-4.4.9	6 weeks
Electrical panels	45	Is there proper Danger/415 V signs on electrical panels?	RMG-4.8.3	6 weeks
Electrical panels	46	Is installation of switchboards/panelboards at proper height and in an easy and accessible location?	RMG-4.8.3	6 months

Category	Sl. No	Observations	Code Reference (RMG-NTP)	Timeline for resolution
Electrical panels	47	Are over current protection devices installed at all distribution panels?	RMG-4.10	Immediate
Electrical panels	48	Is there proper working clearance provided near distribution panels?	RMG-4.8.2	6 weeks
Electrical panels	49	Are switchboards/panel boards made by non flammable material? Provide evidence.	RMG-4.16.7.4	6 months
Electrical wiring	50	Are electrical connections properly secured with lugs and glands? Please mention locations of non-compliance.	RMG-4.4.11.2	6 weeks
Electrical wiring	51	Are power and telecommunication/LAN/antenna cables laid separately? Comment on locations of non-conformity.	RMG-4.4.12	6 weeks
Electrical wiring	52	Are wiring systems being selected and erected so that no damage is caused by the ingress of water?	RMG-4.4.4.3	Immediate
Electrical wiring	53	Are cables/wires and MCB/MCCB selected with suitable rating for desired application? Specify locations of non-compliance.	RMG-4.4.10.1	6 weeks
Electrical wiring	54	Is there any cross-circuiting (looping, bunching at MCCB/MCB or bus bar terminal) observed in the panels?	RMG-4.4.1	6 weeks
Electrical wiring	55	Is wiring diagram/circuit list with proper current ratings are available on every distribution boards?	RMG-4.8.3	6 weeks
Electrical wiring	56	Is there non standard cable joints observed in electrical circuit? Specify locations of non-compliance.	RMG-4.4.10.4	1 week
Electrical wiring	57	Are cable penetrations from walls adequately covered and sealed?	RMG 4.5.3	6 weeks
Electrical wiring	58	Are common neutrals observed for more than one circuit? Specify locations of non-compliance.	RMG-4.4.1	6 months
Electrical wiring	59	Are openings properly sealed with appropriate degree of fire resistance, in case of wiring passing through building structure (walls, roof, floors, partitions)? Provide photo evidence for non-compliance.	RMG-4.5.3(4.4.5)	6 weeks
Electrical wiring	60	Are all fixed machines connected with flexible wires/cable or temporary cords?	RMG-4.4.10.2	6 weeks
Electrical wiring	61	Is electrical wiring properly covered in conduit pipes?	RMG-4.4.1 & 4.4.2	6 months
Electrical wiring	62	Is cable entry-exit point to the panel properly sealed?	RMG-4.16.7.1	6 months
Electrical wiring	63	Are cables taken through areas where they are damaged or chemically affected?	RMG-4.16.7.2	6 weeks
Earthing System	64	Is there proper grounding/earthing of transformer provided?	RMG-4.16.7.1	6 weeks

Category	Sl. No	Observations	Code Reference (RMG-NTP)	Timeline for resolution
Earthing System	65	Is proper grounding/earthing of generator provided?	RMG-4.9.1	1 week
Earthing System	66	Is earthing with separate earth pits for HT & LT panels in transformer room provided?	RMG-4.16.7.1	6 weeks
Earthing System	67	Is Earth Continuity Conductor (ECC) adequately & dedicated to circuit provided?	RMG-4.11.2.1 Table-4.5	6 months
Earthing System	68	Is there separate earthing provided on all electrical equipment? Specify locations of non-compliance.	RMG-4.11	6 weeks
Earthing System	69	Is there earthing provided to all distribution boards for its body & door?	RMG-4.11	6 weeks
Lightning Protection System	70	Is lightning protection adequately installed at building roof top?	RMG-4.12	6 months
Lightning Protection System	71	Is adequate and separate earthing system provided for lightning protection?	RMG-4.12	6 weeks
Periodical inspection	72	Does the factory conduct planned periodical inspections and testing for insulation, earth resistance, operation test of all equipments? Comment on availability of records for such inspections.	RMG- 4.16.2 & 4.16.1	Ongoing
Periodical inspection	73	Proper cleanliness maintained in substation?	RMG-4.16.7.1	Ongoing
Thermography	74	Any signs of overloading or abnormal temperature? Any hot spots observed in thermography which need attention?		6 weeks

Fire

For the second phase of National Initiative safety inspections, fire safety of the building was assessed against 67 checkpoints to form an opinion regarding the level of compliance with respect to NTPA guidelines on building assessment for existing RMG factories.

The checkpoints are categorized below, based on the timeline of implementation and the risk they possess.

Sr. No.	Priority Levels	Implementation timelines
1	Immediate	The facility should not continue to be occupied until these non-compliances have been rectified
2	1 week	Action must be incorporated into an electrical safety management plan in 1 week
3	6 weeks	Action (remedy work indicated) must be carried out within a period of 6 weeks
4	6 months	Action (remedy work indicated) must be carried out within a period of 6 months
5	Ongoing	Ongoing activity - factory to implement ongoing periodic inspections for these checkpoints
6	Compliant	Guideline requirement is generally compliant
7	N/A	Checkpoint not applicable to the factory

Non-conformities and the colour-coded timeframe for required action:

Issue No	Observation	Timeline
1	Have all evacuation pathways the minimum required width in accordance with the RMG guideline?	1-2 weeks
2	Are all evacuation pathways free of any permanent obstacles?	1-2 weeks
3	Are all evacuation pathways free of any temporary stored items?	1-2 weeks
4	Do all evacuation ramps comply with the maximum allowable slope?	6 months
5	Does the maximum travel distance from any location of the floor to nearest emergency exit meet the requirement of the code?	6 months
6	Do all floor exit doors and final exit doors swing in the direction of travel?	6 weeks
7	Do the doors in the egress route open easily? Doors cannot be locked at any time in the direction of evacuation.	6 weeks

Issue No	Observation	Timeline
8	Is the width of emergency exits satisfactory?	6 weeks
9	Does the sum of the width of all emergency exits meet the requirement in accordance with the RMG guideline?	6 months
10	Is the number of stairs adequate based on the number of occupants per floor?	6 months
11	Does the minimum width of stairs meet the requirement of standard?	6 months
12	Does the sum of the width of all staircases meet the requirement in accordance with the RMG guideline?	6 months
13	Are handrails provided in all stairways?	6 weeks
14	Is the tread/riser relationship consistent on all stairways?	6 weeks
15	Are internal stairways linking more than two floors fire separated with fire rated walls?	6 months
16	For stairs that require fire separation, are they provided with fire rated self-closing doors?	6 weeks
17	For stairs that require fire separation (such as high rise buildings, >20m height or >6 floors), are they provided with a fire-rated entry lobby?	6 months
18	Are stairways free of any obstacles?	1-2 weeks
19	Are stairways free of any combustibles?	1-2 weeks
20	Is proper protection (e.g. fire-rated barriers) provided for exterior stairs so that the exit path is not obstructed?	6 weeks
21	Are discharge floor exit/premises exit widths based on the number of occupants and minimum allowable width?	6 weeks
22	Do all stairways lead directly to outside or via a fire separated corridor?	6 months
23	Are evacuation routes protected from production areas and high risk uses all the way to outside?	6 months
24	Are any atria present linking more than two floors? If YES, are the upper floors fire separated from the atria?	6 months
25	Are any vertical service shafts passing through more than two floors? If YES, are they provided with required fire resistance rating of walls/doors?	6 months
26	Are any mezzanines present? If YES, are travel distances to a protected stairway or final exit within maximum allowable limits?	6 months
27	Are all lifts provided with proper fire separation?	6 months
28	Does the building have a basement level? If YES, is it appropriately fire separated with an entry lobby, fire walls and fire-rated self-closing doors?	6 months
29	Are permanent/designated storage areas (if adjacent to production area) separated with fire-rated walls/doors?	6 months
30	Are all high risk rooms fire separated from the rest of the operational areas? (boiler room, generator room, substation room, chemical room.)	6 months

Issue No	Observation	Timeline
31	Are any smoke & heat vents required at any atria or storage area?	6 weeks
32	Is there any opening or penetration in slab or wall? If YES, is it properly sealed with appropriate fire rating?	6 weeks
33	Are all evacuation pathways appropriately sign posted?	1-2 weeks
34	Are all evacuation pathways appropriately illuminated with emergency lighting?	6 weeks
35	Are all evacuation stairways appropriately illuminated with emergency lighting?	6 weeks
36	Is the emergency lighting system provided with back-up power supply?	1-2 weeks
37	Are detectors provided? Which type of detectors are provided?	6 months
38	Is there an automatic detection and alarm system that complies with the RMG guidelines?	6 months
39	Are the manual activation points appropriately spaced?	6 weeks
40	Does the alarm system covers all floors?	6 weeks
41	Is the number of detectors sufficient for coverage of the production floors and stores as per standard?	6 weeks
42	Does the factory have provision for periodic checking of alarm call points, alarm & detection system and maintain records properly?	1-2 weeks
43	Are the right number of extinguishers present and properly tagged?	1-2 weeks
44	Are the extinguishers appropriately spaced?	1-2 weeks
45	Does the factory have dedicated fire pump or hydrant system?	6 months
46	Does the dedicated fire pump or hydrant system have alternative power backup?	6 weeks
47	Does the factory have provision for periodic checking of fire pump or hydrant system and maintain records properly?	1-2 weeks
48	Does the number of hoses meet the requirement of the Standard in all floors?	6 months
49	Does the diameter of first aid hose and standpipe meet the requirement of the Standard?	6 weeks
50	Is the performance of hose (water pressure) satisfactory?	6 months
51	Is the standpipe and first aid hose performance being checked periodically and tagged properly?	1-2 weeks
52	Does the factory have sufficient water capacity connected to hose to supply water during peak demand period?	6 months
53	Is a fire lift provided in high rise buildings?	6 months
54	Are fire-fighting truck access roads wide enough and free of obstacles?	6 months
55	Is fire-fighting additional equipment provided at the right location? Sand, water, buckets, etc..	1-2 weeks

Issue No	Observation	Timeline
56	Is a Fire Command Station provided at the ground floor in high rise buildings?	6 months
57	Is/are there P. A. (Public Address) system/s which is/are audible throughout every floor of the factory?	6 weeks
58	Are combustibile materials found near heat/electrical sources (near DB, SDB and electrical installations, loose electrical connection) or stored on the production floor?	1-2 weeks
59	Is back-up power supply provided for the alarm system? Battery, IPS, etc.	6 weeks
60	Is the visual alarm placed and in working condition where required?	6 weeks
61	Does the factory have the valid Fire License/Permit?	6 weeks
62	Does the factory building have approval from the authority?	6 weeks
63	Are all production units/floors covered by the fire license?	6 weeks
64	Does the factory have a single fire safety management system in case of multi tenancy?	6 weeks
65	Does the factory have a boiler license?	6 weeks
66	Does the factory have a boiler operator license?	6 weeks
67	Does the factory conduct fire drills regularly covering all shifts and maintain records properly?	1-2 weeks

Online information:

There are various websites with additional relevant information about safety assessments and safety issues in general:

- DIFE : <http://www.dife.gov.bd/>
<http://database.dife.gov.bd>
- Accord : <http://bangladeshaccord.org/>
- Alliance : <http://www.bangladeshworkersafety.org/>

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