

BANGLADESH RURAL ELECTRIFICATION BOARD

PBS INSTRUCTION 100-75

**EMERGENCY PROCEDURE
AND
DISASTER MANAGEMENT**

**BANGLADESH RURAL ELECTRIFICATION BOARD
PBS INSTRUCTION 100-75**

Approval Date: 19/02/2020

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SUBJECT: EMERGENCY PROCEDURE AND DISASTER MANAGEMENT

1.0 DEFINITION

- (01) **Disaster:** Undesirable damage from natural, manmade, sabots', or any other reasons.
- (02) **Disaster Management:** A series of activities for the purpose of reduction of damage due to disaster, during disaster and after disaster.
- (03) **Emergency Procedure:** Activities to encounter disaster before, during and after disaster.
- (04) **Rescue:** Save the men and assets from damage.
- (05) **Rescue Procedure:** Specific type procedure that must be maintained for rescue specific type victim.

2.0 REASONS OF DISASTER

There are various reasons of disaster, such as effect of Earth Quake, Tsunami, Fire, Cyclone, Storm, Fire, Flood, Water Over-Flow, Tidal, Drought etc. These are natural disaster. Apart from natural disaster, there is man made disaster also, such as war, exhaust gas emission, unplanned industrial development, unplanned township development etc. In this instruction the disaster related with electrical network system, will be discussed.

3.0 DISASTER FROM EARTHQUAKE AND TSUNAMI

3.01 Definition

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- (01) **What is Earthquake:** Earthquake is vibration of earth. In fact earth is vibrating continuously in each and every moment. Those vibrations are so in smaller scale that nobody can feel it's existence. But when the magnitude of vibration of earth is high we can feel it and it may act as disaster.
- (02) **Reason of Earthquake:** Earth releases energy gained inside it due to overheat, pressure developed from chemical reaction of volcano or head on collision of titanic plate.
- (03) **Tsunami:** Over-flow of water due vibration/earthquake occur at the bottom of Ocean.

3.02 Characteristics of Earthquake

There are three types of earthquake. They are-

- (01) P-Wave: Intensity of earthquake is higher at some interval and lesser just after higher.
- (02) S-Wave: Vibration earth is upward and downward.
- (03) Surface-Wave: Vibration mainly on the surface of earth.

3.03 Effect of Earthquake

The following effects may be happened due to earthquake-

- (01) Damage of houses, roads, bridges, and other infrastructures;
- (02) Damage of life;
- (03) Damage of trees, crops and nature;
- (04) Land slide;
- (05) Earth surface crack;
- (06) Tsunami;
- (07) Fire.

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3.04 Scale and Intensity of Earthquake

Richter Scale	Magnitude
Less than 5	Small
5 - 6	Moderate
6 - 7	Large
7 - 7.8	Major
7.8 or above	Great

3.05 Responsibility in different phase of Earthquake

3.05.1 Alert Phase Disaster of Earthquake:

The following precaution should be taken in alert phase of earthquake to minimize damage of life and assets-

- (01) Make building abide by the approved building code;
- (02) Check gas, water, electric and sewerage line in every 6(six) months and keep record properly;
- (03) Marking emergency outgoing path of the building;
- (04) Anchor furniture, freeze and any other vertical nature items;
- (05) Store heavy weight items on the floor;
- (06) Save emergency phone numbers, such as ambulance, Fire Brigade, Volunteer rescuer;
- (07) Emergency Evacuation practice should be done in each months;
- (08) Emergency items, such as whistle, cell phone, power pac, hammer, helmet, dry food, emergency medicine, first aid box, etc. should be kept in a bag and hang it near outgoing door;

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- (09) Make Shelter, Control room, volunteer rescuer team;
- (10) Emergency treatment center;
- (11) Turn off gas stove after cooking;
- (12) Make committee headed by responsible officer and distribute responsibility for rescue, fire-fighting, electric line repair and maintenance etc.

3.05.2 Disaster Phase of Earthquake:

The following precaution should be taken in disaster phase of earthquake phase to minimize damage of life and assets-

- (01) Go out the building within 5 to 10 second and take place in open place away from high rise building, billboard, tree, electric pole and other similar type of structure;
- (02) Turn off gas stove, electric line, water line etc.;
- (03) If you unable to go out within 5 to 10 second, take shelter under strong and hard table, cot, with helmet/ cushion/ pillow on head;
- (04) Don't take shelter near items, such as, book shelf, almira, Show case etc.;
- (05) Don't take shelter under hanging items, such as ornamental lights;
- (06) Don't use lift;
- (07) Shut off all feeders of all sub-stations.

3.05.3 Recovery Phase of Disaster of Earthquake:

The following measure should be taken in recovery phase of earthquake to minimize damage of life and assets-

- (01) To save charge don't use cell phone unnecessarily;
- (02) If you are caught under heavy weight, don't use our energy unnecessarily. Wait for rescuer until 72 hours. Make sound by hard body to draw attention of rescuers;
- (03) If you are at out side don't enter into the building for any valuable items. Life is more valuable than any other. Keep in mind 2nd, 3rd, 4th --- wave can hit just after few

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minutes;

- (04) Don't try to rescue anybody if you are not properly trained for that purpose;
- (05) Don't try to remove debris if you are not properly trained how to remove;
- (06) Find out and identify damage of electric system using BREB Form No. 100-75-01.
- (07) All committee will function as per responsibility pre-allocated;
- (08) Keep contact with Central Committee of BREB and report if there any damage;
- (09) Keep away dead body if any as per his/her respective religion;

4.0 DISASTER FROM FIRE

4.01 Definition

- (01) **Fire:** Fire is the result of continuous reaction chemical reaction between fuel, oxygen (O₂) and sufficient heat.
- (02) **Fuel:** Burning materials that has latent heat energy.
- (03) **Oxygen(O₂):** Oxygen is one kind of gas that helps fire.
- (04) **Fire Triangle:** A triangle each arm of which represents Fuel, Oxygen(O₂) and Heat respectively produced fire is called Fire Triangle.
- (05) **Fore Orders:** The policy and procedures for dealing in case of fire and fire accident.

4.02: Introduction

Fire Orders are applicable to all Stores/Warehouses and Offices under the Bangladesh Rural Electrification Board and PBSs. These orders lay down the policy and procedure for dealing with the cases of fires and fire accidents in the areas mentioned above. All personnel of all Categories and Grades irrespective of their status and position bear responsibility for the prevention of fires and fire accidents. This can be accomplished by acting wisely, carefully and vigilently in the different spheres of activities to all personnel.

4.02 Classification, Type and Principle of Fire

According to British Standard (BS4547) there are 5-classes of fire. The following table

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describes detail-

SL	Fire Class	Fire Type	Fire Principle	Example
(1)	Class A	Solid Fire	Cooling or Combustion inhibiting	Fire in ordinary material such as wood, paper, textile, rubbish which produce ashes
(2)	Class B	Liquid Fire	Flame inhibiting, Smothering & Cooling	Fire in flammable liquids such as oils & greases.
(3)	Class C	Gaseous Fire	Flame inhibiting	Fire in gases like methane, acetylene etc.
(4)	Class D	Metallic Fire	Smothering & Cooling	Fire in metallic elements like magnesium, sodium, titanium, zirconium
(5)	Class E	Electric Fire	Flame inhibiting	Fires involving electrical hazards or shocks

4.03 Causes of Fire and Fire Accidents

Accidents and fires do not originate on their own. These destructive occurrences owe their origin to carelessness, willful negligence and acts of sabotage on the part of employees and outside agencies. It is, therefore, the duty of all officers and staffs to guard against those factors. Careless throwing away of live cigarette butts, unplanned disposal of paper waste, rubbish and careless custody of fuel, Oil and lubricant constitute some of the potential sources of fire. Similarly, careless handling of heavy equipment, cranes, forklifts and heavy packages lead to accidents.

4.04 Effect of Fire

The following effects may be happened due to fire-

- (01) Damage of houses and other infrastructures;
- (02) Damage of life;
- (03) Damage of assets;
- (04) Damage of forest;
- (05) Damage of ecological balance.

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4.05 Process of Extinguisher

The followings are the process of extinguisher-

- (01) Starvation
- (02) Smothering
- (03) Cooling

4.06 Fire Fighting System

The followings are the fire fighting systems-

- (01) Fire extinguishers;
- (02) Fire Hose;
- (03) Branch pipe or hose nozzle;
- (04) Fire hydrant system;
- (05) Automatic water sprinkler system;
- (06) Carbon dioxide (CO₂) system;
- (07) Foam system;
- (08) Extinguishing powder system.

4.07 Type of Fire Extinguisher

Data given in the following table for Widely used fire extinguisher-

Type	Color	Weight (Kg)	Capacity	Discharge Time (Sec)	Discharge Distance	Class Type	Operation Type
Water Type	Red	15(±)	6 - 9 liter	55-60	6 m	A	Pressure & Gas Cartage
Foam Type	Cream	15(±)	6 - 9 liter	30-45	4 m	A, B	
DCP Type	Blue	10-17	1 - 12 Kg	08-20	3-6 m	A, B, C	
CO ₂ Type	Black	15-20	1 - 12 Kg	09-26	2-3 m	B	Pressure

Apart from those four type fire extinguisher the followings are also used in specific class of fire-

- (1) Soda acid type;
- (2) Halon type.

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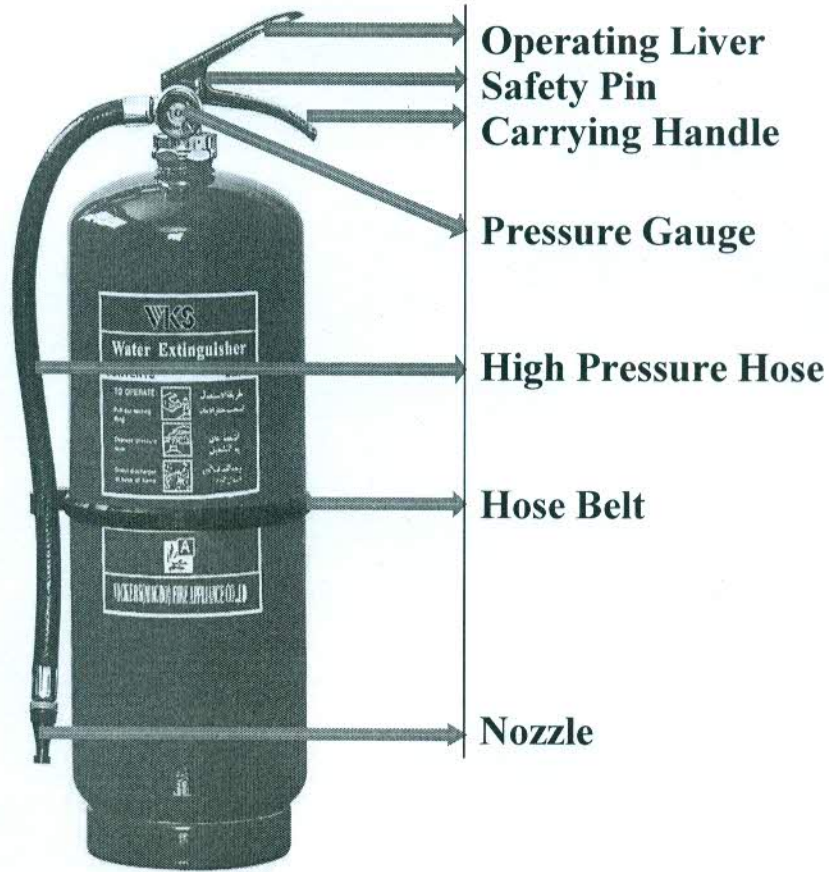
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4.08 Component of Fire Extinguisher



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4.09 Operating System of Fire Extinguisher

For operating purpose of a fire extinguisher PASS is widely used-

	P	Pull The Pin
	A	Aim at the Base of Fire
	S	Squeeze the Lever
	S	Sweep from Side to Side

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4.10 Fire Extinguisher Table

The following table will help to select fire extinguisher for specific type of fire-

Type	Solids (Woods, Papers, Cloth etc.)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
Water Type	✓	X	X	X	X
Foam Type	✓	✓	X	X	✓
DCP Type	✓	✓	✓	✓	X
CO ₂ Type	X	✓	X	✓	✓

4.11 Procedure in case of Fire and Fire Fighting

A) Any employee becoming aware of a fire on RE property will proceed as follows-

- (01) Sound fire alarm where possible;
- (02) Notify his/ her authority;
- (03) Call for assistance immediately from any employee;
- (04) Call Fire Brigade Limited and Civil Defence (FBLCD) Department. Their hot line number is 102, 02-9555555 and for emergency service: 999
- (05) Use appropriate fire fighting equipment;
- (06) Alert people to evacuate immediately using emergency exit door.

B) Fire Fighting

Fire fighting arrangement is an integral part of Security. Efficient and adequate fire fighting arrangement is essential to prevent the outbreak of fire.

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Individuals detecting any fire will shout "Fire, Fire, Fire" and will immediately rush along with others to fight against fire with all available fire fighting appliances. The Senior most present at the scene of fire will must immediately take control and at the same time he/ she will convey the message to the local Fire Brigade Limited and Civil Defence (FBLCD) from the nearest available telephone or cell phone with him/her. Immediately on receiving the information about the fire, the Assistant Engineer/Assistant Director/ AGM(Admin/HR) Concerned Officer should notify the Deputy Director, warehouse/ Senior General Manager/ General Manager of PBS, Director (CS&M) and concerned authority of BREB by fastest possible means.

A separate 'Directive' fixing the areas of fire points and responsibilities of fire fighting parties and individuals will be issued in details, by Assistant Engineer/ Assistant Director/

AGM(Admin/HR)/ Concerned Officer. Individuals will be trained in the use of available fire fighting appliances and responsibilities. The Assistant Director/AGM(Admin/HR)/ Concerned Officer or Security Supervisor will arrange to provide necessary fire fighting appliances. Chemicals of fire fighting appliances must be replaced just after expiry date from authorized dealers. For this purpose 50 (fifty)% appliances should be repacked in one day and next 50 (fifty)% on the following day so that there will be no vacancy for any moment to meet emergency and crisis.

4.12 The main objective of Fire Protection system.

- (01) Automatic detect the presence of fire and ring fire alarm and send signal to FBLCD at an early stage (if there is national auto system probation);
- (02) Indicating the location of fire;
- (03) Ringing an effective alarm in time;

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- (04) To summon the personnel in the area to evacuate;
- (05) To summon neighbors to fight the fire using Extinguishers or Fire hoses;
- (06) To send alarm to remote station which in turn will take further action;
- (07) To activate the automatic Fire protection.

4.13 Components of Fire protection system.

- (01) Smoke Detectors;
- (02) Heat Detectors;
- (03) Flame Detectors;
- (04) Glass bulb sprinklers;
- (05) Linear Heat sensor Cables;
- (06) Bells and Sounders;
- (07) Automatic Fire pumps;
- (08) Fire water reserve Tank;
- (09) Fire Hydrant, Hose pipe and Branch Nozzles;
- (10) Centrally high pressure pipe water supply system;
- (11) Fire Alarm control panel;
- (12) Manual call point etc.

4.14 Phases of Disaster from Fire:

4.14.1 Alert Phase Disaster from Fire:

The following precaution should be taken in alert phase of fire to minimize damage of life and assets-

- (01) Make building abide by the approved building and fire fighting code;
- (02) All doors of emergency exit will be made of fire proof materials;
- (03) There will be no obstacle and burning rubbish on emergency exit;

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- (04) Marking emergency exit door;
- (05) Floor marking must be made of yellow paint;
- (06) Check gas line and electric line, switch, fuse, holders, socket, circuit breaker, ACR, OCR, Oil circuit breaker, capacitor, PA system, intercom, , groundings, CC TV & Camera etc. in each month and keep record properly;
- (07) Install fire extinguisher and sand bucket at each proper place;
- (08) Check fire fighting system & equipment, expiry date of fire extinguishers, water level of reserve water tank in each month and keep record properly. Refill fire extinguisher from authorized dealer/trader if it is expired;
- (09) Marking emergency outgoing path of the building;
- (10) Don't store unusable materials. Old garbage of materials and papers must be removed and cleaned on regular basis;
- (11) Don't use combustible materials for partition and other wall and false ceiling;
- (12) Keep for record fire fighting instructions and emergency phone numbers, such as ambulance, FBLCD, Volunteer rescuer and display these instructions and phone numbers in suitable places of office, sub-station, switching station, lift and residential campus/area;
- (13) Maintain record of attendance of all employees in each day;
- (14) Arrange meeting, fire fighting practice and assembly in each month. Ensure 50% participation in each fire fighting practice and assembly and rest 50% of employ shall participate in the next meeting, fire fighting practice and assembly. Record evacuation time and try to reduce evacuation time;
- (15) Check water level of reserve water tank;
- (16) Check cooking stove, gas cylinder, kitchen;
- (17) Installed one appropriate fire extinguisher in kitchen;
- (18) Educate each family member on fire fighting and practice in each month;
- (19) Prohibition Board will be fixed in all important places to warn the people for not

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Smoking. Smoking will only be allowed in selected places away from explosive & combustible materials. These places will be specified in a separate security directive or office order;

- (20) Sufficient water and sand buckets will be provided at visible important Area/ Zone.
- (21) Check electrical wiring for basic insulation level, switches, circuit breakers, other appliances and ground connections in every 6(six) months and for this purpose BREB Form No. 100-75-02 (enclosed) shall be used;
- (22) It is recommended to replace all low and high voltage wiring and service entrance cables before degradation its insulation level from allowable range;
- (23) Electrical load must be within the capacity range of electrical equipment so that body/ oil temperature does not exceed its allowable limit;
- (24) Gas burner and regulator must be checked on regular basis.

4.14.2 Disaster Phase of Fire:

The following precaution should be taken in disaster phase of earthquake phase to minimize damage of life and assets-

- (01) Inform proper authority immediately;
- (02) Make sound by fire alarm;
- (03) Call FBLCD people immediately;
- (04) Call PGCB to disconnect source line of PBS sub-station. Disconnect affected 11 KV feeder(s);
- (05) Get out the building using emergency exit immediately without delay time. Don't use open stair, if smoke is surrounded. Never use lift.
- (06) If there is smoke try to get out the building by crawling. **Don't raise your head above 18 inches from floor. Remember, oxygen is only available up to 18 inches from floor in a smoked room/place;**

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- (07) Follow yellow marking of floor to look for emergency exit in smoked room, if there is yellowing marking on the floor. Remember, within smoke place no color but only yellow is visible;
- (08) Immediately stand on a line for assembly in the assembly field;
- (09) Count heads as quick as possible;
- (10) Check attendance sheet and find out absentees with his/her office location/ place;
- (11) Provide this list of absentees in assembly with his/her office location/ place to the fire fighting people and rescuer of FBLCD.
- (12) **Note:** *Don't open any window or door of burned closed room*

4.14.3 Recovery Phase of Disaster of Earthquake:

The following measure should be taken in recovery phase of earthquake to minimize damage of life and assets-

- (01) Look for missing people (if any);
- (02) Find out list of damage items. For this purpose use BREB Form No. 100-75-01;
- (03) Start repair and damage items gradually from substation in case of electrical system damage. Energize after test each line section;
- (04) Inform immediately to BREB authority about amount and type of damage;
- (04) Replace all wiring cable, burned line conductors, switches, holders, circuit breakers, and other burned electrical equipment. Remember if wiring cables of a burned house looks normal, steel they must be replaced. Insulation is totally lost due to heating effect; Inform BREB authority every day progress;
- (05) Note down the causes of fire, Weakness of fire fighting, and way of improvement;
- (06) Process for initial inquiry. After completing initial inquiry analyze report. Who was responsible? Where was failure? Than formal and final inquiry may be conducted. It depends on initial inquiry report.
- (07) Reinstalled all fire extinguishers and refill them if they are empty due to use for the

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fire fighting purpose.

Note: Regarding Fire, Fire Fighting and Fire Order for warehouses and stores are separately written in section 6.12, 6.13 and 7.0 of PBS Instruction 100-15. It is required to follow this instruction along with those mentioned sections of PBS Instruction 100-15 (Store Manual for Warehouse and Stores of BREB and PBSs).

5.0 EMERGENCY PROCEDURES FOR NATURAL DISASTER

5.01 GENERAL

- (a) Bangladesh is such an area where disasters and unusual natural calamities frequently occur. Especially, 15 districts of the coastal belt e.g. Chattogram, Noakhali, Feni, Barishal, Khulna and Satkhira region and other surrounding areas have been identified as sensitive area where the people may be affected by cyclone and tidal wave all on a sudden. PBSs located in that areas should have proper planning in advance to face possible disasters.
- (b) Proper emergency planning is essential to establish an effective operating plan for the electric network system. Many storm and other natural calamities occur with very little warning and require that the BREB & PBS authority respond very quickly to repair the damaged facilities and restore electric service as soon as possible. Both in BREB and PBS level there should be all-out preparation to ensure minimum damages during disasters. There should be a well-organized material and manpower planning to respond and restore electricity as quickly as possible, providing full safety to equipment and life.

5.02 ACTION PLAN FOR DIFFERENT PHASES OF DISASTER MANAGEMENT.

To face any emergency like storm, cyclone, flood, fire, earthquake etc. there will be Liaison Committees in BREB & PBS level to maintain liaison with the affected PBSs & then with the Control Room of Power Division under the Ministry of Power, Energy and Mineral resources.

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(1) The BREB Liaison Committee will comprise of the following members:

- (a) Chief Engineer, Planning & Operation, BREB : Convener & Liaison Officer.
(b) Director, System Operation, BREB : Member-Secretary
(c) Director (MP&SS), BREB : Member
(d) Director, PBS Monitoring & Management
Operation, Concern Zone, BREB : Member
(e) Executive Engineer, S/S Construction Div, BREB : Member
(f) Executive Engineer, System Protection, BREB : Member

(2) In PBS level there will be another Liaison committee which will co-ordinate with BREB Liaison committee. The PBS Liaison Committee members will be as follows:

- (a) SE, Concerned Zone, BREB : Convener & Liaison Officer
(b) Sr. GM/GM, Concerned PBS : Member-Secretary
(c) Concerned Executive Engineer, BREB : Member
(d) DGM (Tech-HQ), PBS : Member
(e) AGM (O&M), PBS : Member
(f) AGM (E&C), PBS : Member
(g) AGM (MS), PBS : Member
(h) AGM (Admin), PBS : Member
(i) AGM (Finance) : Member

Zonal SE of BREB will be responsible for monitoring & ensuring preventive maintenance & disaster planning and Concerned Executive Engineer of BREB will help in material allocation and solving technical problems of the PBSs.

In collaboration with system operation & **PBS Monitoring & Management**

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Operation Directorates, Training Directorate of BREB will conduct training programs for the PBS personnel to train-up on disaster management and emergency procedure & planning.

5.2.1 ALERT & WARNING PHASE

A. NO WARNING OF A STORM AND ANY OTHER UNUSUAL NATURAL CALAMITIES

Storms, earthquake or other natural calamities can occur with essentially no warning. The emergency plan should be used in this case. All available operating personnel required to restore service should be sent to inspect the lines and the supporting office personnel will attend telephone calls, damage reports, etc.

B. EARLY WARNING OF A STORM AND ANY OTHER UNUSUAL NATURAL CALAMITIES

On many occasions, advance warning is given to alert personnel of storms or other natural calamities that could damage the distribution lines. This is the time for action. The PBS Liaison Committee will review the plan for managing emergency & maintain a readily available emergency operating force including an appropriate number of technical personnel from O&M, E&C and Member Service Department of the PBS. Should the storm develop, additional operating and office personnel should be called into service as required. Service can be restored much faster if all available personnel are utilized.

C. NECESSARY PRE-PREPARATION TO FACE A STORM OR ANY OTHER UNUSUAL NATURAL CALAMITIES

The following precautionary measures are to be taken to protect the substation,

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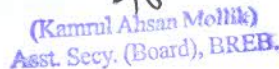

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distribution lines, life, property etc.:

- (a) Each PBS should have sufficient budget provision for emergency expenses.
- (b) All sorts of transport to be repaired earlier as required to make them running and ensure the sufficient reserve of fuel before emergency.
- (c) Always keeps ready-stock of O&M materials in concerned PBSs. BREB will also establish additional stock for emergency O&M Materials (such as Pole, Conductor, Transformer, fuse etc.) in the Warehouses.
- (d) Keep a 5 KW standby Generator at PBS Head Quarter (HQ).
- (e) Full time manpower should be deployed at electrical sub-station with sufficient tools, materials and fire fighting equipment.
- (f) Communication equipment sets & batteries of both BREB & PBSs should always be kept in working condition. At the same time Radio with battery should be kept in the affected PBSs as required to know the latest information of weather.
- (g) Keep pre-arrangement for evacuation of staff/workers of the PBS to the nearest safe area, if necessary. First-Aid Box should be kept workable for officers/staffs.
- (h) Regular preventive maintenance of the distribution system should be carried out to prevent equipment failure of sub-station & lines, conductor snapping, pole & insulator breaking etc.
- (i) Set up central control rooms both in BREB HQ. & in the affected PBSs, whenever cyclone/flood or any other disaster warning is announced. Both BREB & PBSs control rooms are to be kept open round the clock during disaster period.
- (j) Set up one or more focal point officer in BREB HQ & in the affected PBSs to inform the immediate information to the Control Room of the Ministry of Power, Energy and Mineral resources, Power Division & Central Control Room at BREB HQ respectively. PBS Control Room will keep constant contact with local administration and law enforcing agencies etc.
- (k) PBSs should contact with nearest Meteorological offices and collect the

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forecasting of weather ahead of unusual natural calamities occurring season. PBSs should provide the telephone/mobile number to the nearest Meteorological offices, so that Meteorological office will be able to inform the weather forecasting to the PBSs.

- (l) Entire Disaster period (up to recovery period) shall be treated as emergency period. So all sorts of leave will be cancelled and no leave will be allowed for the officers/employees (except special/exceptional cases) till situation will be normal.
- (m) Emergency Service Gang (ESG) should be kept ready as stand by for the restoration of affected distribution system as early as possible.
- (n) Minimum two mobile phone with additional battery and power pac should be kept at each service center of the affected area, so that they can contact with ESG.
- (o) Immediately before any unusual natural calamities, the sub-station and all power supply source as well as 11 KV feeder lines should be kept switched off for the safety of sub-station equipment, distribution lines & equipment, life and property etc.
- (p) Public awareness may be improved of the probable affected area by miking, sending SMS etc. about information of natural calamities.
- (q) Offices in the coastal belt, the tidal wave may hit with a height of 8-12 ft. So, important records/files, equipment/materials of the office and sub-station/lines may be shifted at safe place.
- (r) Concerned BREB & PBS transports will be kept ready for emergency O&M material transportation.
- (s) BREB Liaison Committee will depute additional line crews required for sub-station & line rehabilitation work from the non/less affected adjacent PBSs as & when necessary.
- (t) Each PBS will make a priority list of consumers like Hospitals, Clinic, Pathological Laboratory, Radio & TV stations, Airports, University, Important

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installations (Civil & Military), Mobile phone and telephone communication tower etc., whose power supply will be restored on priority basis.

- (u) Sub-station wise single line diagram of entire electric network must be kept ready in hand. All section points on single diagram must be identified with color.

5.2.2 DISASTER PHASE

A. STEPS & PRECAUTIONARY MEASURES ARE TO BE TAKEN DURING DISASTER

The following steps & precautionary measures are to be taken during disaster:

- (a) Liaison officer in BREB HQ should maintain the continuous/contact with the Control Rooms to communicate the information.
- (b) If the load decrease rapidly of the affected area due to damage of transmission/distribution line/ distribution system, then local grid control room or PGCB will be requested/informed to reduce the load allocation of that area.
- (c) Before energize the lines in the coastal belt, the clearance should be checked properly, because at that time the tidal height will be higher than normal.
- (d) Emergency power supply may be arranged by Generator, because mobile phone communication may be disrupted due to failure of electric power.
- (e) Both BREB & PBS control rooms are to be kept open round the clock in disaster period.
- (f) Arrangements should be made to ensure speedy supply of O&M materials to the affected areas.
- (g) Power supply is to be restored on priority basis as early as possible. BREB HQ will render all necessary assistance as required by the PBSs.

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B. EMERGENCY PLAN

There are several key steps in dealing with an emergency. These are:
Emergency Alert and Mobilization

When a storm or other destructive force causes damage to the distribution system, the first step is to notify all personnel having emergency duty stand-by assignment, that damage has been inflicted on the electric system. Then begin mobilizing the work forces. The operating personnel and office staff should be assigned appropriate tasks as quickly as possible by concerned Senior General Manager/General Manager.

It is recommended that mutual assistance agreements be established among the adjacent PBSs so that the operating, supervising and office staff personnel from those PBSs can be utilized during an emergency with the help of BREB. When these agreements are established, the total work-force can be substantially increased to aid in restoration of service. If mutual assistance agreements are developed between PBS areas, each PBS headquarter shall maintain information packets that will be used to communicate information to the personnel arriving from other PBS areas. This packet should include such items as :

1. Map of the area including Single Line Diagram (SLD).
2. Lodging facilities.
3. Places to obtain food.
4. Workmen's protective tags and caution tags.
5. Names of key personnel in PBS who should be contacted for assistance.
6. Other data-as required.

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The Assistant General Manager (HR/ Admin) will be responsible for arranging housing, food and other requirements for all emergency operating personnel.

5.2.3 RECOVERY PHASE

A) STEPS TO BE TAKEN AFTER DISASTER

- (a) Immediate after disaster the extent of damage of distribution system to be assessed and will prepare a preliminary report with cost. Immediately identify the works to be done and will prepare a plan for restoration & rehabilitation of power as quick as possible.
- (b) According to the plan possible dates of restoration of power to be informed to the consumers of different affected areas.
- (c) The snapped conductors due to cyclone/tornado to be replaced as quick as possible.
- (d) The electric saw should be used for cutting and removing the trees upon the lines.
- (e) The report of damages with cost of distribution system to be informed to the local administration.
- (f) Necessary steps should be taken to quick restore the power of the affected areas. If required, additional assistance of material and manpower may be taken from other utilities and necessary approval can be taken over telephone through central control room.
- (g) Emergency Rehabilitation Project (ERP) may be taken on the basis of the volume of damages.
- (h) For quick carrying of materials/equipment/tools the necessary transports may be arranged by the help of local administration.
- (i) Steps to be taken to protect from the theft of the damaged materials and

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equipment at site by the help of the law & order enforcing agencies.

B) APPRAISAL AND INSPECTION OF DAMAGE

A trouble report form (Exhibit 4.1) shall be used to record the trouble. The trouble report is to be made by PBS Operation & Maintenance department personnel, Concerned BREB personnel, Electrical consultant/Retainer consultant. A list of the forms sent to the field shall be maintained in the PBS headquarters. These reports must be returned to the headquarters for use in directing proper dispatch of repair crews.

The PBS Liaison Committee will assess the extent of damage caused by the disaster, fund requirement for restoration & rehabilitation of power & forward it to BREB. The above committee will submit a proposal with plan and cost estimate for restoration & rehabilitation of damaged electrical network system, if it is deemed to be necessary.

After the return of field personnel, with the reports of trouble as found, assemble this data to determine what the total extent of damage is. It may be necessary to acquire additional assistance at this point, if it is available, subject to the indicated extent of damage to the system (damaged equipment, broken insulators & poles, etc.)


5.2.4 RESTORATION OF SERVICE

The PBS Liaison Committee will begin analyzing the trouble forms as soon as they are available and will determine the sequence to restore service in the following order:

- Get the Power supply source line cleared & energized.

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- b) Get the substations energized.
- c) Get the Back-bone lines cleared & energized.
- d) Determine the critical loads that are to be energized first (see 4.2.1.C(t). Proceed with restoring power to consumers like Hospitals, Radio-TV stations, University, Airport, Civil & military installations on priority basis.
- e) Proceed with full restoration of service.

All personnel shall be advised of conditions that they may encounter, which are caused by the disaster. Advise them of flooding conditions, write down conditions etc. Make certain that all field personnel understand that the tagging and clearance procedure is to be followed. Alert them that no line is to be considered de-energized until it is tagged and grounded. PBS Instruction 100-31 strictly be followed for this purpose.

All actions taken to restore service must be performed in a safe, workmanlike manner to ensure safety to working personnel and the public.

Rest periods must be established for all emergency personnel as well as a twenty-four hour work-force will be maintained by organizing roaster duty.

5.3 ELECTRICAL SYSTEM DAMAGE-FINAL SURVEY

Sometimes, damaged lines will not cause customer outages. To protect against this possibility, all circuits must be patrolled as soon as possible after all known customer and line problems are corrected. The problems found shall be corrected as soon as possible.

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5.4 PRECAUTIONARY MEASURES THAT ARE TO BE TAKEN DURING HIGH FLOODING

- a) The power transformers are to be switched off when flood water rises up to the control boxes.
- b) The Voltage Regulators should be by-passed when flood water rises up to control boxes. The control boxes of the regulators are to be disconnected and removed when flood water rises up to it.
- c) If the distribution lines are to be kept energized during high flooding red tags & other special signs are to be hanged in the substation & for the distribution lines, announcement is to be made to keep the people informed that the lines are energized & it will be dangerous to come across the lines. The electrical lines will be kept energized only as long as approved clearance from flood water level to conductor is maintained.
- d) Security measures are to be taken so that substation & distribution line equipment & materials are not stolen.
- e) After the flood is over the electrical lines & equipment will be inspected thoroughly and the insulation resistance of substation equipment should be tested & oil samples taken from the equipment those were flooded also be tested before they are energized.

5.5 RE-ENERGIZATION PROCEDURES FOR FEEDERS THAT HAVE BEEN DE-ENERGIZED DURING HIGH FLOODING.

- (1) Open the outgoing line side disconnect switch and OCRACR/Breaker at

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- substations, or open the disconnect switches or jumpers at the tap pole.
- (2) Install a set of grounds on the first pole after the open sectionalizing point and install a red hold-off tag.
 - (3) Begin inspecting the line, repair any damage that needs to be renovated before the line can be re-energized and using BREB Form No. 569 make note of any rectification work that may be required in the future such as, straighten pole, replace anchor, or re-sag conductor.
 - (4) During inspection of the feeder, open all cutouts of transformers, taps and feeders. If no disconnect switches are available, cut the jumpers and secure them in a safe place.
 - (5) When a feeder or line has been found to be acceptable, or has been repaired up to a sectionalizing point, install a set of grounds on the first pole after the open sectionalizing point and install a red hold-off tag.
 - (6) Remove the first set of grounds and red tag.
 - (7) Test energize this section of line to ensure that nothing was over-looked during the inspection.
 - (8) Using the above procedure patrol and inspect the next section of line using the following table for line and transformer energization priorities:
 - (a) Lines and transformers that serve hospitals.
 - (b) Lines and transformers that serve cantonments and police stations.
 - (c) Lines and transformers that serve cold storage facilities.
 - (d) Lines and transformers that serve bazar areas.
 - (e) The remaining three phase lines and transformers.
 - (f) The remaining single phase lines and transformers.

5.6 CYCLONIC PRECAUTIONS AND ACTION PLANS DURING CYCLONE AND POST CYCLONE PERIOD.

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A. Introduction

PBSs in the coastal belt e.g. Cox'sbazar, Chattogram, Noakhali, Feni, Lakshmipur, Barishal, Bhola, Patuakhali, Borguna, Jhalakathi, Pirojpur, Bagerhat, Khulna and Satkhira regions and other possible areas where cyclone may hit should be aware of cyclonic damage and tidal wave. PBSs of these areas should have proper advance planning to face any possible cyclonic disaster and tidal wave. The PBSs of these area's should have sufficient stock of different sizes of poles, conductors, insulators, cross arms, guy wires, distribution transformers of each size and lightning arrester etc. to meet the repair and replacement needs after cyclonic disaster.

B. Cyclonic Warning

After receiving warning, operation and maintenance people should be fully prepared with tools, tackles, splicing tools and other supporting staffs so that they can move to the field for repair and salvage work of the electrical lines and substations without any delay. After the disaster is over, they should take every effort to restore power supply. Adequate care should be taken in safe-keeping of hardware materials, tools and equipment so that these are not washed away by tidal wave.

C. Disaster Period

Immediately before the cyclonic storm and other natural calamities, the substation should be kept off for the safety of substation equipment, electrical lines, life and property etc. The VHF/HF wireless set/Telephone/Mobile phone etc. should be kept operative round the clock so that information regarding the development of the cyclone can be communicated from PBS area offices to PBS Head Quarter and from PBS Headquarter to BREB Head Quarter. Local Law enforcing agencies

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should be kept informed of the cyclonic damage.

D. Post-Disaster Period

After the disaster period, operation and maintenance crews should immediately move to the field to restore power supply after repair and salvage work of the substation, electrical lines and associated equipment. Only the substation should be energized first. Then the feeder circuits should be energized section after section. Emergency loads such as Hospital, Clinic, Pathological Laboratories, Airport, University, Important Installation of civil & military, Radio & TV Station with their relay station, Mobile phone and telephone communication tower and other essential like drug, food and drinking water industries should be energized on priority basis. Adequate precautions should be taken to safeguard the life of the working crews from any possible accident. Broken Poles and conductors should be replaced on emergency basis. Plan should be taken to perform the repair work round the clock. The repair works can be divided into different groups. A trouble report form should be filled up showing the extent of damage caused by the cyclone. BREB system Operation/PBS Monitoring and Management Operation Directorates should be informed about the extent of

assistance required from BREB H/Q and the total cost involved in repair and salvage work of the substation and electrical lines. Zonal Superintending Engineer and Concerned Executive Engineer of BREB should also be approached for assistance both with materials and contractor, who in turn shall assist the PBS in such situation.

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5.7 EMERGENCY PLAN UPDATE

After each emergency, review the established emergency plan to determine corrections or additions that should be made to improve emergency procedures.

5.8 CAPACITY BUILDING FOR EMERGENCY

- (a) At present, the media is regularly broadcasting the message ahead of unusual natural calamities through Meteorological Department. With the basis of this message all sorts of precautionary measure should be taken. For the interest of operation and maintenance of electrical system, it is necessary to form Rehabilitation Team by concerned officers and employees and arrange to train them.
- (b) PBSs should arrange drill with officers and employees time to time for fire fighting with the help of local fire brigade.
- (c) For the sensitive areas for unusual natural calamities a strength line construction design may be prepared and introduced for constructing new line. Such as higher class Pole, 40 ft or above pole for HT, 30 ft Pole for LT, double cross-arm (steel structure) and necessary guy may be used.

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Note

1. It is not possible to cover hundred percent steps of activities to combat disaster, because of its different type of nature. Guideline of this instruction along with personal judgment, past experience, adequate training and practice can help to maintain proper emergency procedure, plan and management of disaster. To combat disaster, SOP (Standard Operating Procedure) of Government, fire fighting policy and procedure of FBLCD shall also be followed. It is advised to follow and comply them. With the help of FBLCD, Local administration, police administration training and practice can be conducted. Don't forget to save hot line contact number and local phone number of FBLCD, number of control room of CEGIS, and WDB.
2. For the purpose of fire fighting of central warehouses of BREB and stores of PBSs, PBS Instruction 100-15 along with 100-75 shall be followed.

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BREB Form No.100-75-01 (Version-1)

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TROUBLE REPORT FORM

Date: ----- Taken by: -----

Time: ----- Special Attention: -----

Name:	Wire Down Burning	
Village :	Wire Down Pole to Pole	
Other Location Description :	Pole Broken	
	Area without Power	
	No Power	
	No Light	
	Tree or Branch on Wire	
	Wire Down Pole to House	
	Dim or Flickering Light	
Time Outage Occurred:	Street Light Damage	
Assigned to:	Date:	Time:

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