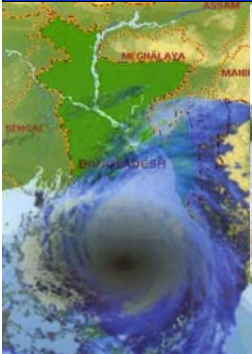




Workshop on



Emergency Telecommunications for Disaster Management in Bangladesh



Power Sector's Perspective

Presented By

Engr. A N M Obaidullah

Sub Divisional Engineer



Bangladesh Power Development Board



29th March 2006

Presentation Outline

- **Preamble**
- **Extent of Major Disaster in Power Sector**
- **Disaster/Security Plan for Power Sector**
- **Present Communication System of Power Sector**
- **PLC Communication System of Western Zone**
- **PLC Communication System of Eastern Zone**
- **Existing Optical Fiber Network of Power Sector**
- **Future Optical Fiber Network of Power Sector**
- **Microwave System**
- **Conclusion**

Preamble

Bangladesh is identified as a natural disaster prone area in the globe. Due to geographical situation and climate, natural disaster is a common scenario in this country. In comparison with earthquake risk maps of the USA, Bangladesh is comparatively less Seismic than California. For Design purpose, in the coastal area, wind velocity is considered as 250 Km/hour and surge height is 10~15 meter. Mitigation and preparedness is the only way to face the challenges of disaster.

Extent of Major Disaster in Power Sector

Cyclone

In 1988 and in 1991, devastating cyclone damaged the distribution system of Western and Southern Zone of Bangladesh respectively. Small Diesel Power Stations & Power System in offshore islands were completely washed away by storm surge.



Flood

In 1988 and in 1998, a few number of substations (Ullon, Moulavibazar, etc) were inundated due to severe flood.



Earthquake

In 2003, earthquake damaged bushing of the Power Transformer & Transformer itself at Modunaghat Grid Sub Station in Chittagong and damaged School building of Karnaphuli Hydro Power Station at Kaptai.



Disaster /Security Plan for Power Sector

Alert and Warning Phase –

- ◆ Designating a focal point for disaster management.
- ◆ Set up central / local control room.
- ◆ Set up communication with all bases.
- ◆ Mobilize manpower, transport, tool and maintain emergency lines.
- ◆ Set up standing committee centrally and base level at affected areas.
- ◆ Electric lines to shut off to prevent accident.
- ◆ Keep ready in stock emergency electrical material.

Disaster Phase -

- ◆ Run the Control Room round the Clock
- ◆ Ensure speedy supply of material

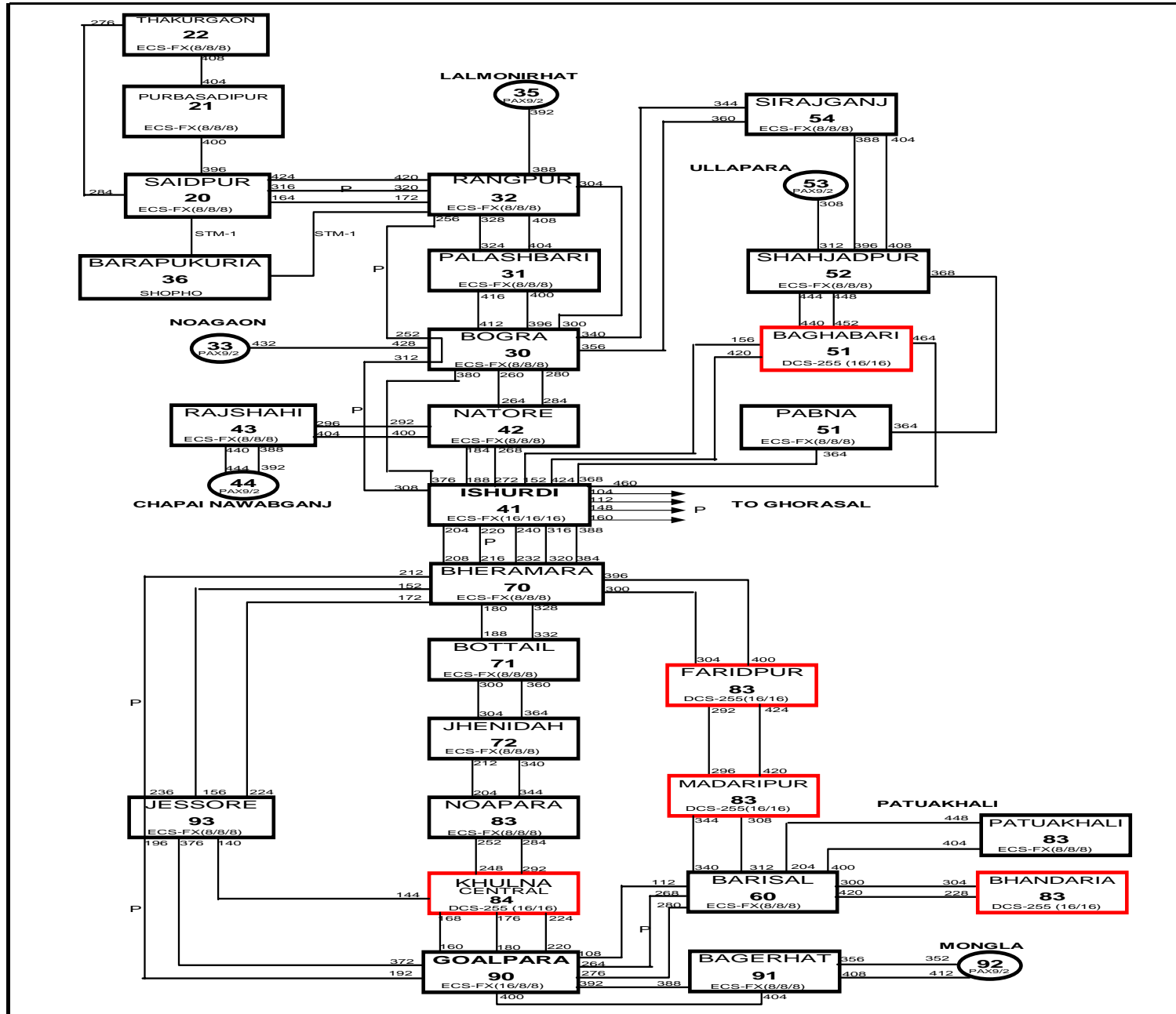
Recovery Phase -

- ◆ All efforts to restore power supply
- ◆ Assess the fund required for restoration and rehabilitation
- ◆ Prepare plan for rehabilitation

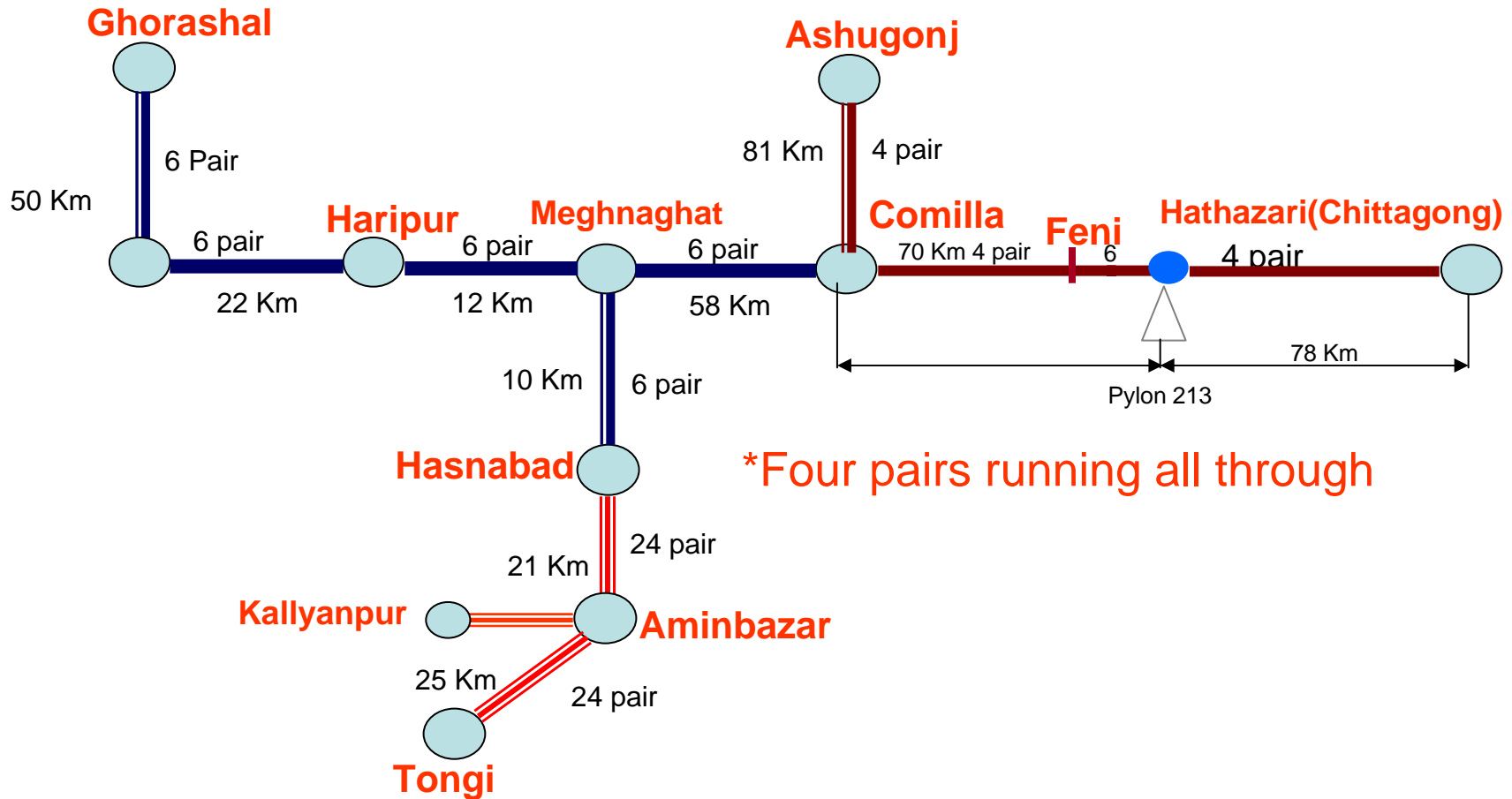
Present Communication System of Power Sector

- For day to day routine works and system operation Power Sector maintains its own communication system called Power Line Carrier (PLC) Communication using its high voltage transmission lines connecting all the power plants and high voltage sub-stations (230 KV& 132 KV) with the Load Dispatch Center.
- The functions include Telecommunication, Tele-protection, Data-transmission, Supervisory Control and Data Acquisition (SCADA) , Economic Load Dispatching etc.
- The frequency band of the existing PLC communication system is very low (100 Khz to 500 Khz) and its speech band is only 4 Khz.
- To overcome the low bandwidth limitation and to expand communication system, installation of optical fiber over high voltage transmission lines throughout the whole country is going on.
- Until now about 500 Km optical fiber (single mode) has already been installed around Dhaka and Dhaka to Chittagong route as OPGW (Optical Ground Wire) without having any terminal equipment.

PLC Communication Network of Western Zone

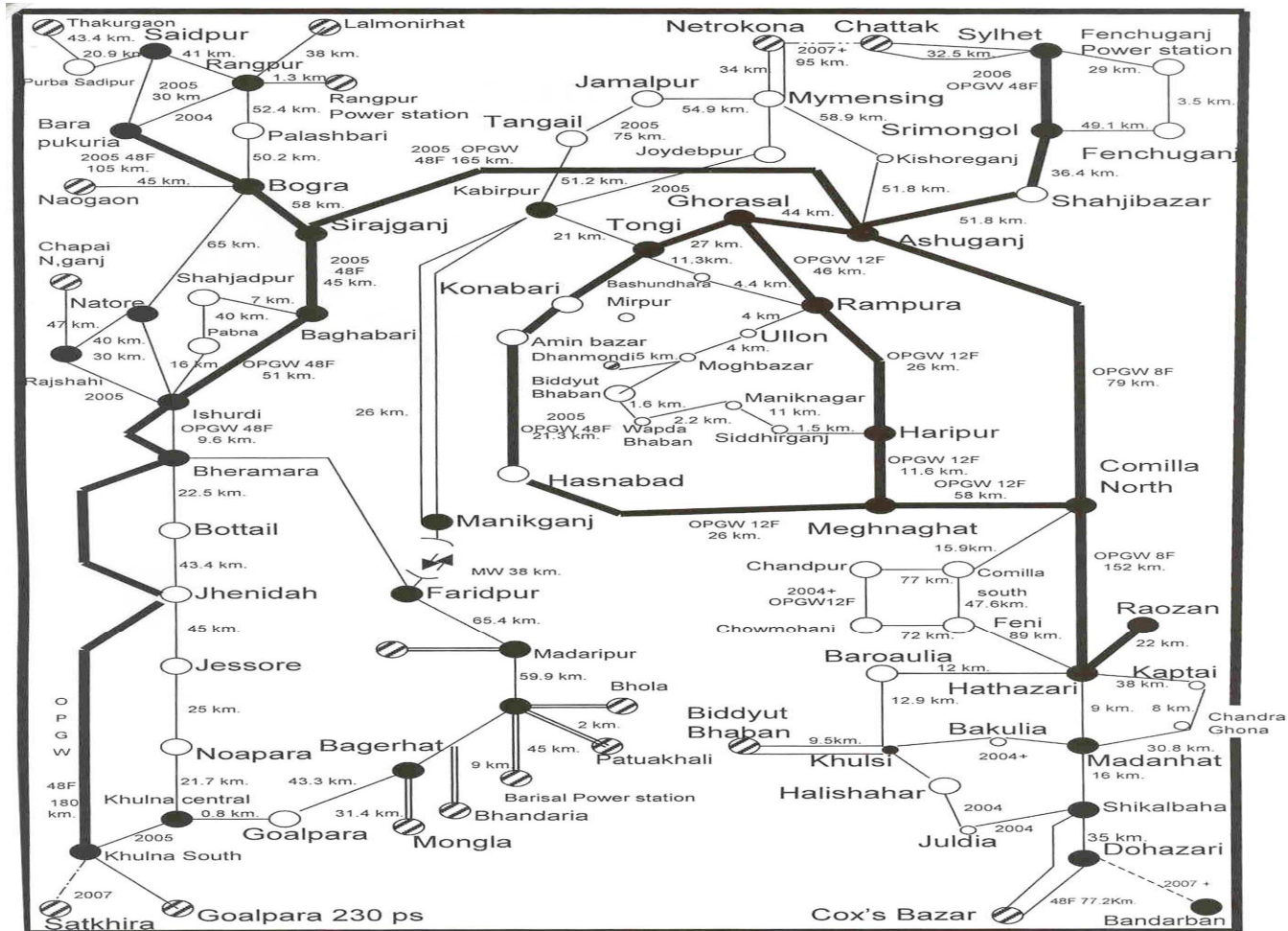


Existing Optical Fiber Network of the Power Sector



Under NLDC project about 1450 Km optical fiber will be installed on the existing transmission lines throughout the whole country by FY 2007.

Future Optical Fiber Network of the Power Sector



After completion of NLDC project most of the district towns of Bangladesh could be connected at Cox's Bazar with the optical submarine cable.

Future Optical Fiber Network of the Power Sector

Under NLDC project about 1450 Km optical fiber will be installed on existing transmission lines throughout the country. The Transmission Lines which will be equipped with Optical Fiber as per follows –

- Comilla – Feni – Hathazari – Madanhat – Shikalbaha – Dohazari – Cox's Bazar 132 KV transmission line (288 Km).
- Bheramara – Faridpur – Madaripur – Barisal– Patuakhali 132 KV transmission line (275Km).
- Ishurdi – Natore – Rajshahi – Chapai Nawabganj 132 KV transmission line (153 Km).
- Ashuganj – Shahjibazar – Srimongol – Fenchuganj – Sylhet – Chattak transmission line (200 Km).
- Ashuganj – Ghorashal – Tongi – Kabirpur – Manikganj (170 Km).
- Bheramara – Botail – Jhenaidha – Jossore – Noapara – Goalpara – Bagerhat – Mongla 132Kv (180Km).
- 45 Km Under ground optical cable in different locations will also be installed.

Future Optical Fiber Network of the Power Sector

- Under NLDC project about 782 Km 230 KV and 527 km 132 KV new transmission lines will have Optical Ground Wire, which includes –
 - Khulna – Bheramara – Ishurdi – Baghabari – Sirajganj – Bogra – Barapukuria 230KV transmission line (447 Km).
 - Ashuganj – Sirajganj 230 KV transmission line (165 Km).
 - Rangpur – Bara pukuria – Saidpur 132 KV transmission line (80Km).
 - Mymensingh – Joydebpur – Kabirpur – Tangail – Madhupur – Jamalpur 132 KV transmission line (447 Km).

Microwave System

- One Microwave link between Faridpur and Manikganj has been planned to make redundancy in case of disruption of Sirajganj – Ashuganj Optical link between the East and West part of the country.
- The link is approximately 38 Km in length and crosses the Padma river (the aerial distance is roughly 5 Km).
- The link shall operate in the 7.5 GHz band and shall carry one or more STM-1 Signals.

Conclusion

- During Disaster, PLC of the power sector could be a good choice for emergency communication, where normal Tele-communication will be impossible.
- To extend the service of PLC system as backup communication during disaster especially in the costal belt, microwave link with the PLC system may be considered.
- The Optical network of Power Sector will be much reliable and safe in comparison to other Optical Fiber Network because this optical network has been installed over the high voltage transmission line and so it is free from most of the unwanted interruptions.



Thanks to All

