

APPENDIX 1. MEMBERS OF THE SURVEY TEAM

(1) BASIC DESIGN TEAM

Makoto KASUGA	Leader Deputy Director, Observations Management Division, Observations Department, Japan Meteorological Agency
Akira NISHIHARAGUCHI	Telecommunication Planner Special Adviser, Communication Policy Bureau, International Cooperation Division, Ministry of Posts and Telecommunications
Eiichi SAITO	Project Coordinator Telecommunications Development Specialist Japan International Cooperation Agency (JICA)
Seiichi SHINOKI	Meteorological Telecommunication Network System Planner International Meteorological Affairs Division, Japan Weather Association
Katsusuke YAMAGUCHI	Meteorological Data and Display Processing Planner International Meteorological Affairs Department, Japan Weather Association
Hiroshi TOSHIMA	Telecommunication Facilities Designer International Meteorological Affairs Division, Japan Weather Association
Hideaki KAKEI	Telecommunication Facilities Designer Engineer, International Meteorological Affairs Division, Japan Weather Association
Masaharu IDO	Facilities Designer Overseas Works Division, Nissoken Architects/Engineers Japan Weather Association
Yoshihisa UCHIDA	Civil Engineer/Architect Overseas Works Division, Nissoken Architects/Engineers Japan Weather Association

(2) DRAFT REPORT EXPLANATION TEAM

Makoto KASUGA Leader
Director, Kushiro Local Meteorological Observatory,
Japan Meteorological Agency

Toru FUJITA Member
Grant Aid Division, Economic Cooperation Bureau,
Ministry of Foreign Affairs

Seiichi SHINOKI Member
International Meteorological Affairs Division, Japan
Weather Association

Hiroshi TOSHIMA Member
International Meteorological Affairs Division, Japan
Weather Association

Katsusuke YAMAGUCHI Observer
International Meteorological Affairs Department, Japan
Weather Association

APPENDIX 2. STUDY ITINERARY

(1) Basic Design Study

from Jan. 13 to Feb. 16, 1992

1. Jan. 13 Mon. Narita-Bangkok Departure from Japan.
2. 14 Tue. Bangkok-Dhaka Seven survey team members arrived at Dhaka.
3. 15 Wed. Visit of courtesy to JICA Office.
Visit to BMD. field trip to facilities.
4. 16 Thu. Visit of courtesy to Economic Relations Division (ERD) and Planning Commission.
Discussion with BMD.
5. 17 Fri. Discussion within survey team members.
Putting equipment in order.
6. 18 Sat. Narita-Bangkok Discussions with BMD & BTTB.
7. 19 Sun. Bangkok-Dhaka Discussions with BMD & BTTB.
Two survey team members arrived at Dhaka.
8. 20 Mon. Discussions with BMD & BTTB.
Visit to JICA Office.
Data collection for cost estimation.
9. 21 Tue. Discussions with BMD & BTTB.
Data collection for cost estimation.
10. 22 Wed. Discussions with BMD & BTTB.
Signing Minutes.
Data collection for cost estimation.

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| 11. | 23 Thur. | | Discussion with BMD.
Reporting to Embassy of Japan.
Reporting to JICA Office. |
| 12. | 24 Fri. | | Discussion within survey team members. |
| 13. | 25 Sat. | Dhaka-Bangkok | Three survey team members left Dhaka for Japan.
Discussions with BMD & BTB.
Data collection for cost estimation. |
| 14. | 26 Sun. | Bangkok-Narita
Dhaka-Barisal | Three members returned to Japan.
Transfer.
Discussions with BMD & BTB. |
| 15. | 27 Mon. | Barisal-Khepupara
Dhaka-Chittagong | Transfer.
Transfer. |
| 16. | 28 Tue. | | Field survey at Khepupara.
Field survey and data collection at Chittagong. |
| 17. | 29 Wed. | Khepupara-Barisal
Chittagong-Chiringa
-Cox's Bazar | Field survey at Khepupara. Transfer.
Field survey at Chiringa.
Transfer. |
| 18. | 30 Thur. | | Field survey at Barisal.
Field survey at Cox's Bazar. |
| 19. | 31 Fri. | Barisal-Patuakhali
-Barisal | Field survey at Patuakhali.
Transfer.
Field survey at Cox's Bazar. |
| 20. | Feb. 1 Sat. | | Field survey at Barisal.
Cox's Bazar-Chiringa Field survey at Chiringa.
-Chittagong Transfer. |

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| 21. | 2 Sun. | Barisal-Khulna
Chittagong-Satkania
-Chittagong | Transfer.
Field survey at Satkania.
Transfer. Field survey at Chittagong. |
| 22. | 3 Mon. | | Field survey at Khulna.
Field survey at Chittagong. |
| 23. | 4 Tue. | | Field survey at Khulna.
Field survey at Chittagong. |
| 24. | 5 Wed. | Khulna-Sreepur
-Khulna
Chittagong-Dhaka | Field survey at Sreepur.
Transfer.
Transfer. |
| 25. | 6 Thur. | Khulna-Dhaka | Transfer.
Putting equipment in order.
Discussion with BMD.
Data collection for cost estimation. |
| 26. | 7 Fri. | | Discussion within survey team members.
Putting equipment in order. |
| 27. | 8 Sat. | | Field survey at Dhaka Central.
Discussion with BMD.
Data collection for cost estimation. |
| 28. | 9 Sun. | | Discussion with BMD.
Putting collected data in order.
Data collection for cost estimation. |
| 29. | 10 Mon. | | Field survey at Mogh Bazar, Dhaka.
Data collection for cost estimation. |
| 30. | 11 Tue. | | Discussions with BMD & BTB.
Data collection for cost estimation. |
| 31. | 12 Wed. | | Discussions with BMD & BTB.
Reporting to JICA Office. |

32. 13 Thur. Discussions with BMD & BTTB.
Reporting to Embassy of Japan.
33. 14 Fri. Discussion within survey team members.
Putting equipment in order.
34. 15 Sat. Dhaka-Bangkok Reporting to BMD.
All survey team members left Dhaka
for Japan.
35. 16 Sun. Bangkok-Narita Arrival in Japan.

APPENDIX 2. (Continued)

(2) Draft Report Explanation

from Apr. 20 to May 1, 1992

1. Apr. 20 Mon. Narita-Bangkok Departure from Japan.
2. 21 Tue. Bangkok-Dhaka Arrival in Bangladesh.
Visit of courtesy to JICA Office,
discussion of schedule.
3. 22 Wed. Visit of courtesy to ERD and Planning
Commission.
Discussion with BMD, explanation of
Draft Report.
4. 23 Thu. Explanation of Draft Report and
presentation of draft minutes to BMD and
BTTB.
5. 24 Fri. Dhaka - Cox's Bazar Transfer to Cox's Bazar via Chittagong
6. 25 Sat. Cox's Bazar - Dhaka Inspection of Observatory and radar site.
Transfer to Dhaka.
7. 26 Sun. Visit of courtesy to and discussion with
BTTB.
Discussion of draft minutes with BMD and
BTTB.
8. 27 Mon. Signing of minutes.
9. 28 Tue. Discussion with BMD, tour of facilities.
(Dhaka - Bangkok) Departure of Fujita from Bangladesh.
10. 29 Wed. Report to JICA Office and Embassy of
Japan.
(Bangkok - Narita) Arrival of Fujita in Japan.

11. 30 Thu. Dhaka - Bangkok Report to BMD.
Departure from Bangladesh.
12. May. 1 Fri. Bangkok - Narita Arrival in Japan.

APPENDIX 3. NAME OF DISCUSSANTS

Bangladesh Meteorological Department (BMD)

Mr. M. H. Khan Chowdhury : Director, Dhaka
Mr. M. F. Qayyum : Deputy Director (Hqrs'), Dhaka
Mr. M. A. Khaleque : Deputy Director (Engineering), Dhaka
Mr. M. Ershad Hossain : Deputy Director (Planning & Training), Dhaka
Mr. Md. Ashraf Ali Howlader : Sr. Communication Engineer, Dhaka
Mr. Nasir Uddin Bhuiyan : Sr. Electronic Engineer, Dhaka

Mr. Anwarul Kabir : Deputy Director, Meteorological & Geophysical Centre, Agrabad,
Chittagong

Mr. Enamul Haque : Assistant Meteorologist, Meteorological & Geophysical Centre,
Agrabad, Chittagong

Mr. Asadur Rahman : Meteorologist, Main Meteorological Office, Potenga Airport,
Chittagong

Mr. B. N. Podder : Electronic Engineer, Radar Station, Cox's Bazar

Mr. Azizul Haque : Electronic Engineer, Khepupara

Mr. Md. Azizur Rahman : Assistant Meteorologist, Khepupara

Mrs. Hasina Begum : Meteorological Assistant, Khepupara

Mr. Ismail Hossain : Electronic Assistant, Khepupara

Mr. Majibur Rahman : Electronic Assistant, Khepupara

Mr. Md. Amirul Azad : Meteorological Assistant, Patuakhali

Mr. M. Jakaria Ahmed : Professional Assistance, Khulna

Brig. Nasrat Ali Quraishi : Joint Secretary (T&M)

Mr. M. A. M. Zia Uddin : Joint Secretary (Gen.)

Mr. Khalilur Rahman : Deputy Secretary

Lt. Col. Sayed Anowar Hussain : Engineering Adviser

Mr. Mohammad Nurul Baset : Research Officer, Planning Cell

Bangladesh Telegraph and Telephone Board (BTIB)

Mr. A. K. M. Badrul Alam : Member, M&O, Dhaka

Mr. Fazlur Rahman : Member, Planning & Development, Dhaka

Mr. A. K. Towfiqur Rahman : Member, Finance, Dhaka
Mr. A. A. Manjour Hasan : Member, Administration, Dhaka
Mr. M. Matiur Rahman Khan : General Manager, Transmission, Dhaka
Mr. Md. Fazlur Rahman : Director, International, Dhaka
Mr. Mosharraf Hossain : Director, Transmission-I, Dhaka
Mr. M. Amanat Ullah : Director, Transmission-II, Dhaka
Mr. Md. Shamsul Alam : Divisional Engineer, Dhaka
Mr. Hafizur Rahman : Divisional Engineer, M/W MTCE, Div-II, Mogh Bazar

Mr. Doulat Hossain : Divisional Engineer (C&W), Chittagong
Mr. Gias Uddin Ahmed : SDE Microwave MTC, Chittagong
Mr. Aminul Islam : Sub-Assistant Engineer, Microwave, Chittagong

Mr. Gazi Mohammad Moslem : Telecommunication Technician Radio, Khepupara
Mr. Shafiqul Islam : Assistant Engineer (C&W), Patuakhali
Mr. Mazedul Islam : Sub Divisional Engineer, Barisal
Mr. Ardhendu Sekhar Debnath : Sub Assistant Engineer, Barisal
Mr. Shamsuddin Ahmed : Sub Assistant Engineer, Barisal
Mr. Abdul Barik Sikder : Telecommunication Technician Radio, Barisal
Mr. Abdul Malek Gazi : Assistant Engineer (C&W), Khulna
Mr. S. M. Ibrahim : Senior Sub Assistant Engineer, Khulna
Mr. Shamsur Rahman : Sub Assistant Engineer (C&W), Sreepur
Mr. Matiur Rahman Khan : Sub Assistant Engineer, Pirojpur

Planning Commission

Mr. Muhammad Sirajuddin : Member
Mr. M. O. Hadi : Division Chief
Mr. Abdus Samad : Joint Chief (Communication)

Economic Relations Division (ERD)

Mr. Abdul Hossain : Deputy Chief Secretary
Mr. Rafiqul Islam : Assistant Chief

Embassy of Japan

Mr. Y. Ichihashi : Minister-Counsellor

Mr. T. Ota : First Secretary

Mr. K. Inoue : Second Secretary

JICA Bangladesh Office

Mr. T. Imazu : Resident Representative

Mr. H. Naito : Deputy Resident Representative

Mr. T. Naruse : Deputy Resident Representative

Sadharan Bima Corporation Reinsurance Division

Mr. Golam Mustafa : Assistant General Manager

Bangladesh Bank Head Office, Exchange Central Department, Exchange Account Section

Mr. Mohammed Habib Ullah : Officer-II

APPENDIX 4. LIST OF COLLECTED DATA

- 1) 1991 Statistical Year book of Bangladesh
Bangladesh Bureau of Statistic
- 2) Directory
Institute of Architects Bangladesh
- 3) Three Year Rolling Programme (1991-92 to 1993-94)
Planning Commission Programming
- 4) Annual Development Programme 1991-92
Planning Commission
- 5) Mid-Term Review of the Third Five Year Plan 1985-90
Planning Commission.
- 6) Small Area Atlas of Bangladesh Mauzas and Mahallahs of Khulna District and Patuakhali District
Bangladesh Bureau of Statistics
- 7) Bangladesh Economic Survey 1989-90
Ministry of Finance. Finance Division
- 8) Building Construction Laws Second Edition, 1989
Syed Lutfor Rahman, Soilur
- 9) Cyclone '91 An Environmental And Perceptional Study
Bangladesh Centre For Advanced Studies
- 10) Report of the Task Forces on Bangladesh Development Strategies For The 1990' s
Volume One - Four
Policies For Development
- 11) Patterns, Levels, Trends in Mortality And Regional life Tables For Bangladesh
: Evidence From Sample Vital Registration System 1981-88
Bangladesh Bureau of Statistics

APPENDIX 5. MINUTES OF DISCUSSIONS (BASIC DESIGN STUDY)

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
ESTABLISHMENT OF MICROWAVE LINK FOR METEOROLOGY
IN THE PEOPLE'S REPUBLIC OF BANGLADESH

In response to a request from the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct a Basic Design Study on "the Project for Establishment of Microwave Link for Meteorology" (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bangladesh the Basic Design Study Team (hereinafter referred to as "the team"), which is headed by Mr. Makoto Kasuga, Deputy Director, Observations Management Division, Observations Department, Japan Meteorological Agency, and is scheduled to stay in the country from 14th January to 15th February, 1992.

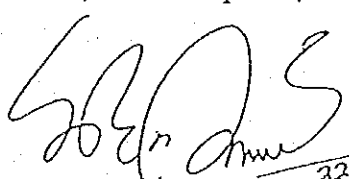
The team held discussions with the officials concerned of the Government of Bangladesh and conducted a field survey at the study area.

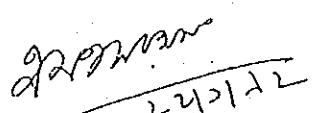
In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.

Dhaka, January 22, 1992

春日信

Makoto Kasuga
Leader
Basic Design Study Team
JICA


M.H. Khan Chowdhury
Director
Bangladesh Meteorological
Department


Md. Fazlur Rahman
Director, International
Bangladesh Telegraph and
Telephone Board

ATTACHMENT

1. Objective of the Project

The objective of the Project is to establish microwave link for meteorology between Storm Warning Center, Dhaka and the radar stations at Cox's Bazar and Khepupara in order to improve cyclone forecasting/warning system and to reduce loss of lives and damage to properties.

2. Project sites

The Project sites are as follows:

- 1) Cox's Bazar;
- 2) Khepupara;
- 3) Storm Warning Center, Dhaka;
- 4) Bangladesh Telegraph and Telephone Board(BTTB) microwave tower sites for establishment of microwave link for meteorology.

3. Executing agency

Bangladesh Meteorological Department(BMD) is responsible for the administration and execution of the Project.

4. Request of the Government of Bangladesh

After discussion with the team, the following items were finally requested by the Bangladesh side.

- 1) Establishment of microwave link between Storm Warning Center, Dhaka and the radar stations at Cox's Bazar and Khepupara by utilizing the existing microwave facilities belonging to BTTB as much as possible.
- 2) Provision of services for the implementation of the Project.

However, the final components will be decided after further studies.

5. Japan's Grant Aid System

- (1) The Government of Bangladesh has understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of Bangladesh will take necessary measures, described in Annex for smooth implementation of the Project, on condition that the Grant Aid

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Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

- (1) The consultants will proceed to further studies in Bangladesh until February 15.
- (2) Based on the Minutes of Discussions and technical examination of the study results, JICA will complete the final report and send it to the Government of Bangladesh by June, 1992.

7. Cooperative items of BTTB

The following things are assured during the course of the interaction.

- (1) BTTB agreed to lease the maximum 10 circuits necessary for the Project to BMD from their available channels.
- (2) BTTB agreed to provide space, if available, on existing radio towers for BMD in case that new antennas for the Project are needed and can be mounted on them considering load capacity and availability of powers.
- (3) BTTB will be responsible for maintenance of newly installed microwave systems.

8. Consideration

- (1) Through discussion, the following problems are recognized by both sides;
 - a. There may be some sites where installation of new towers for the Project is not possible.
 - b. To secure site for the Project should be originally the matter of Bangladesh, but it is difficult to do new sites in Bangladesh.
 - c. However, there may be possible way to solve it from technical point of view; based upon the result of site survey, both sides would make effort to look for the best way to make the Project feasible.
 - d. Reliability of BTTB circuits necessary for the Project will be surveyed and judged by the team.
- (2) BMD and BTTB require necessary training and adequate spares for proper maintenance of system.

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ANNEX

Following necessary measures to be taken by the Government of Bangladesh in case Japan's Grant Aid is executed subject to the existing rules and regulations of the Government of Bangladesh.

1. To secure the site for the Project.
2. To clear, level and reclaim the site prior to commencement of construction, if necessary.
3. To undertake incidental outdoor works such as fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction, if necessary.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site, if necessary.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
7. To ensure necessary taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
8. To exempt Japanese nationals engaged on the Project from custom duties, internal taxes and other fiscal levies which may be imposed in Bangladesh with respect to the supply of the products and the services under the verified contracts.
9. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
10. To bear all the expenses other than those to be borne by the Grant.

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APPENDIX 6. MINUTES OF DISCUSSIONS (CONSULTATION ON DRAFT REPORT)

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY ON
THE PROJECT FOR ESTABLISHMENT OF
MICROWAVE LINK FOR METEOROLOGY
IN THE PEOPLE'S REPUBLIC OF BANGLADESH
(CONSULTATION ON DRAFT REPORT)

In January, 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on The Project for Establishment of Microwave Link for Meteorology (hereinafter referred to as "the Project") to the People's Republic of Bangladesh, and through discussions and field survey in Bangladesh, and technical examination of the results in Japan, has prepared the draft report of the study.

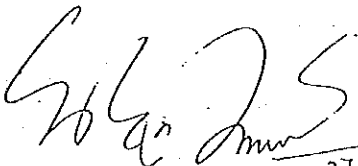
In order to explain and to consult the Bangladesh side, on the components of the draft report, JICA sent to Bangladesh a study team, which is headed by Mr. Makoto Kasuga, Director, Kushiro Local Meteorological Observatory, Japan Meteorological Agency, and is scheduled to stay in the country from April 21 to April 30, 1992.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Dhaka, April 27, 1992

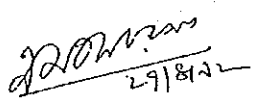
春日 信

Makoto Kasuga
Leader
Draft Report Explanation Team
JICA


M.H. Khan Chowdhury 27.4.92
Director

Bangladesh Meteorological Department

Witnessed by :


Md. Fazlur Rahman
Director (International)
Bangladesh Telegraph and Telephone Board

ATTACHMENT

1. Components of Draft Report

The Government of Bangladesh has agreed and accepted in principle the components of the Draft Report proposed by the team.

2. Japan's Grant Aid system

- (1) The Government of Bangladesh has understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of Bangladesh will take necessary measures, described in Annex, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further schedule

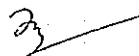
The team will make the Final report in accordance with the confirmed items and send it to the Government of Bangladesh by the end of June 1992.

4. Technical cooperation

The Bangladesh side pointed out the need for dispatch of Japanese experts as well as technical training of counterpart personnel in Japan. They also understood that technical cooperation cannot be requested in the Grant Aid system and that separate official requests should be submitted through government channels.

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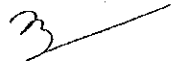
ANNEX

Following necessary measures to be taken by the Government of Bangladesh in accordance with the existing rules and regulations of the Government of Bangladesh in case Japan's Grant Aid is executed.

1. To secure the site for the Project.
2. To clear, level and reclaim the site prior to commencement of construction, if necessary.
3. To undertake incidental outdoor works such as fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction, if necessary.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site, if necessary.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
7. To ensure necessary taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
8. To exempt Japanese nationals engaged on the Project from custom duties, internal taxes and other fiscal levies which may be imposed in Bangladesh with respect to the supply of the products and the services under the verified contracts.
9. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
10. To bear all the expenses other than those to be borne by the Grant.







APPENDIX 7. MINUTES OF MEETING BETWEEN BMD AND BTTB. JAN. 15. 1992

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
BANGLADESH TELEGRAPH & TELEPHONE BOARD
TELEJCGAJCG BHABAN, 36/1, MYNENSING ROAD
(DHAKA-1000)

No. M(2)1-19/76(Part)

Dated: 15.1. 1992

Minutes of Meeting

A joint meeting was held on 14-1-92 between Bangladesh Meteorological Department(BMD) and Bangladesh T&T Board(BTTB) regarding establishment of Microwave telecommunication link between Dhaka-Cox's Bazar and Dhaka-Khepupara under the Chairmanship of Member(maintenance and operation) of BTTB at his Chamber.

The following officers were present at the meeting:

1. Mr. Mosharraf Hossain, Director, Transmission-1, BTTB, Mchakhali, Dhaka.
2. Mr. Md. Fazlur Rahman, Director(International) BTTB, Dhaka.
3. Mr. Md. Shamsul Alam, Divisional Engineer(Carrier and wireless) BTTB, Dhaka
4. Mr. Fakhrul Qayyum, Deputy Director, BMD, Dhaka.
5. Mr. Md. Abdul Khaleque, Deputy Director, BMD, Dhaka.
6. Mr. Md. Ershad Hossain, Deputy Director, BMD, Dhaka.
7. Mr. Md. Ashraf Ali Howlader, Senior Communication Engineer, BMD, Dhaka.

All the points raised by BMD were discussed at the meeting. The following decisions were accepted at the end of discussion.

- i) BTTB agreed to extend all kinds of cooperation to the Japanese survey team in connection with the establishment of Dhaka-Cox's Bazar & Dhaka-Khepupara microwave link.
- ii) BTTB will fulfill the requirements of BMD for 10 channels between Chittagong-Dhaka and Barisal-Dhaka. But new links between Chittagong-Cox's Bazar and Barisal-Khepupara are required to be established, For this the Japanese team has to conduct site survey. A link at Dhaka, between BMD-BTTB may be also necessary. Another meeting will be appreciated with BTTB before preparation of the survey report.
- iii) The microwave links and the equipment to be established through Japanese grant for the links will be operated and maintained by the BTTB. Some Engineers and Technicians of BTTB are also to be trained under the project.
- iv) The following officers are nominated to assist Japanese team during site survey:

Dhaka-Khepupara

Mr. Mazedul Islam, SDE(C&W) Barisal

Dhaka-Cox's Bazar

Mr. Giasuddin, SDE(C&W) Chittagong.

: 2 :

- v) General Manager, Transmission, Mahakhali will work as the Chief coordinator on behalf of BTB.
- vi) It has been decided to issue necessary order to start operation of V.F.T for running the T/P machines located at BMD premises as felt earlier.

The Chairman concluded the meeting with thanks.

Sd/- (Md. Fazlur Rahman)
Director(International)
Phone : 832266

No.M(2)1-19/76(Part)

Dated: 15.1.92

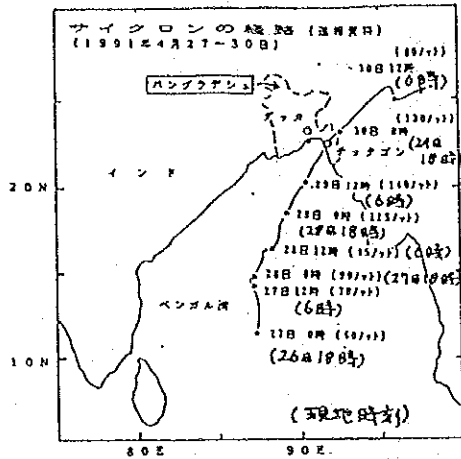
Copy for information to:

1. Member (M & O), BTB.Dhaka
2. General Manager, Transmission, Mohakhali,Dhaka.
3. Participants

Sd/-(Md. Fazlur Rahman)
Director(International)
Phone: 832266

APPENDIX 8. COUNTRY DATA REGARDING THE CYCLONE APR. 29/30, 1991

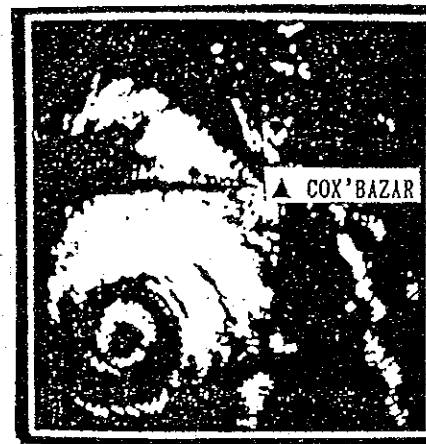
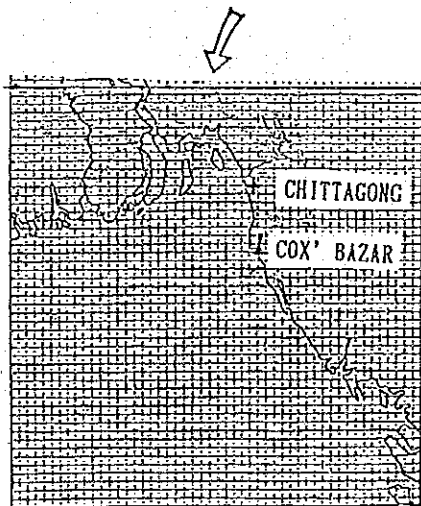
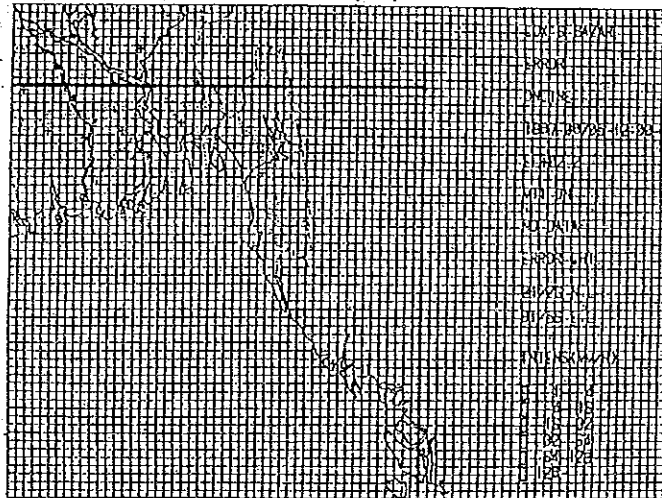
(1) Cox's Bazar Radar Echoes



Figures on this page show the following meanings:

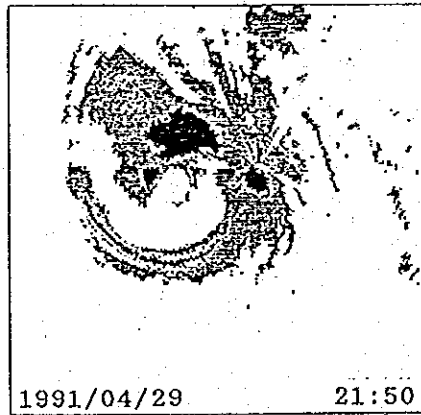
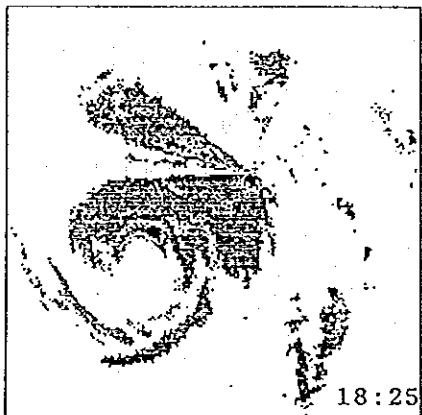
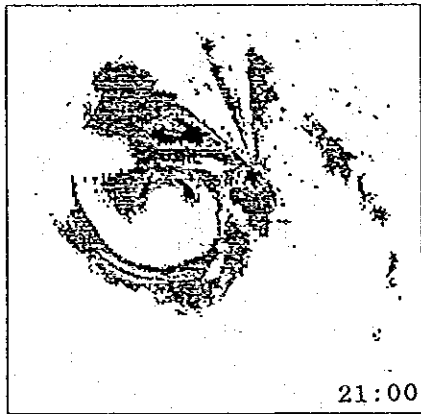
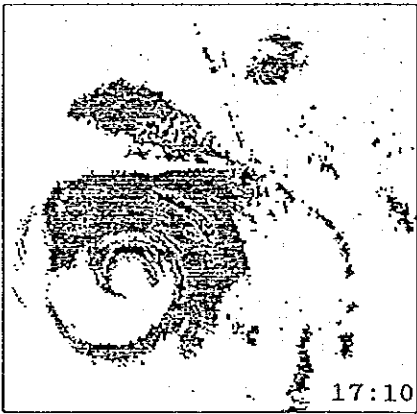
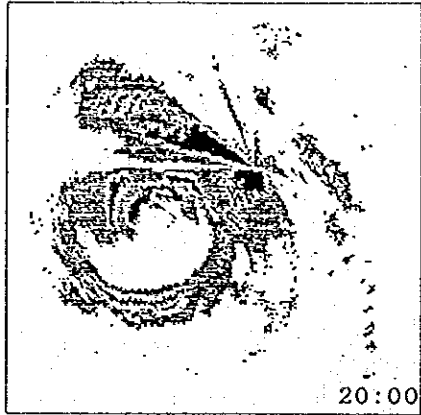
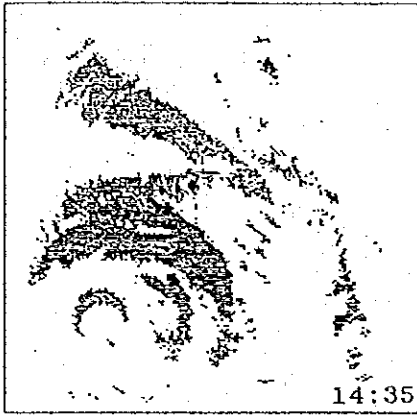
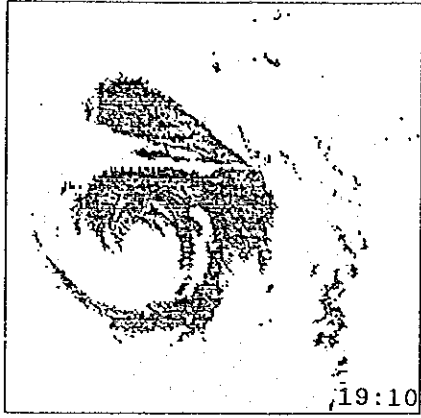
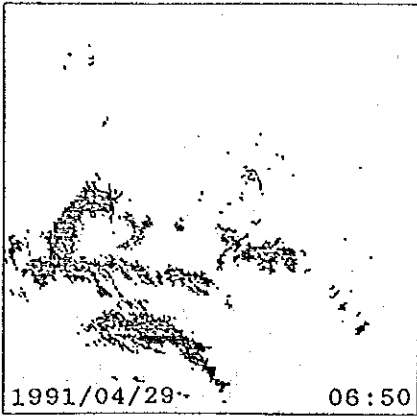
- Upper :Cyclone trajectory,
- Middle :Coastal line and legend superimposed on a screen of the color monitor display at Cox's Bazar radar,
- Bottom left :Cut area from the middle map, which are shown in the following figures,
- Bottom right :Photograph taken from the color monitor display on the same scale as the left map,

Following figures :Time series of the Cox's Bazar radar echo from 06:50 (local time), Apr. 29 to 03:55, Apr. 30, 1991; these radar echoes are processed by the computer program of JMA.



DISPLAYED AREA : 500 km x 500 km

1991 4/29
15:00

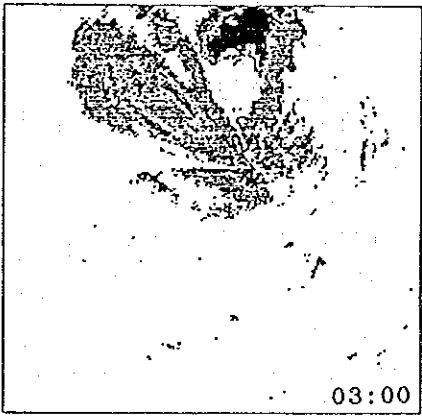
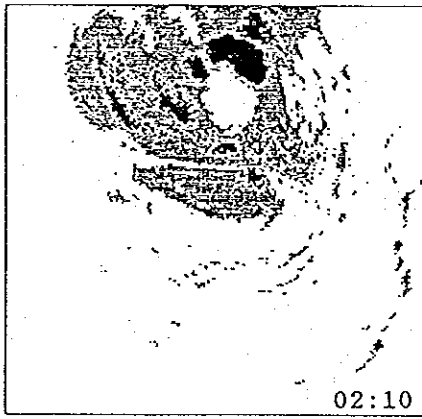
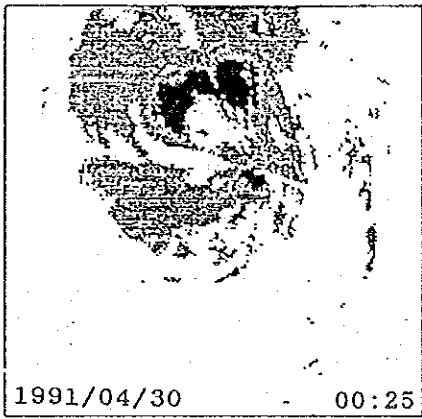
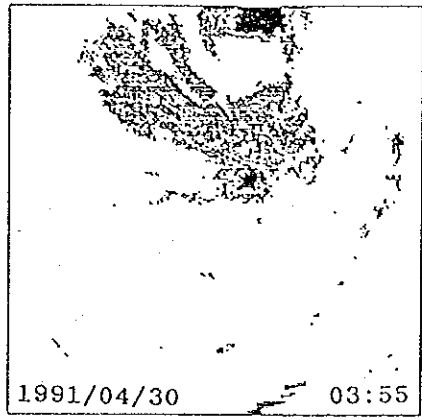
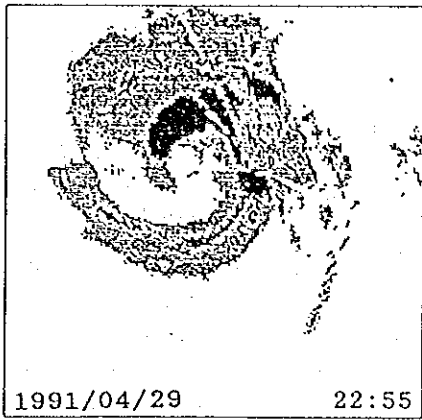


Cox's Bazar Radar

Intensity

■ Weak

■ Moderate & Strong



Cox's Bazar Radar

Intensity

■ Weak

■ Moderate & Strong

(2) Extracts from Special Weather Bulletin, No.1 to No.29

1) No.1 11:20 Apr. 25, 1991

Warning Level :1

A depression has formed over SE Bay and adjoining SW Bay and was centered at 09 A.M. today about 1,400 km (875 miles) SSW of Chittagong port (Lat. 10°N and Lon. 89°E). It is likely to intensify further and move initially an NW-ly direction.

Maximum sustained wind within 45 km of the depression center is about 40 knot/h rising to 48 knot/h in gust/squalls.

Maritime ports of Chittagong, Cox's Bazar and Mongla have been advised to hoist distant cautionary signal number one (R).

All fishing boats and trawlers over north Bay have been advised to keep close to the coast and proceed with caution.

2) No.2 11:50 Apr. 25, 1991

Warning Level :1

Depression over southeast Bay and adjoining SW Bay moved NNW wards, now probably deep and was centered at 6 P.M. today about 1,240 km (770 miles) SSW of Chittagong port (Lat. 11.5°N and Lon. 88.5°E). It is likely to intensify further and move initially in NNW-ly/Northerly direction.

Maximum sustained wind within 48 km of the depression center is about 50 knot/h rising to 60 knot/h in gust/squalls.

Maritime ports of Chittagong, Cox's Bazar and Mongla have been advised to keep hoisted distant cautionary signal number one (R).

All fishing boats and trawlers over north Bay have been advised to remain close to the coast so as to take shelter at short notice.

3) No.3 05:00 Apr. 26, 1991

Warning Level :2

Deep depression over southeast Bay and adjoining SW Bay moved slightly northwards and concentrated in to a cyclonic storm in the same area and centered at midnight last night about 1,220 km (760 miles), SSW of Chittagong port (Lat. 11.8°N and Lon. 88.5°E). It is likely to intensify further and move initially in northerly direction.

Maximum sustained wind within 56 km of the cyclone center is about 65 knot/h rising to 87 knot/h in gust/squalls.

Maritime ports of Chittagong, Cox's Bazar, Mongla have been advised to lower distant cautionary signal number one (R) but instead hoisted Distant Warning Signal Number Two (R).

All fishing boats and trawlers over north Bay have been advised to remain close to the coast so as to take shelter at short notice.

4) No.10 13:30 Apr. 27, 1991

Warning Level :2

Cyclone storm over SE Bay and adjoining SW Bay (with estimated center pressure: 994 hPa) moved northwards in to central Bay and adjoining south Bay and was centered at 12 noon today about 1,120 km SSW of Chittagong port (near Lat. 13°N and Lon. 87.5°E) It is likely to intensify further and move in a north/NE-ly direction.

Maximum sustained wind within 56 km of the storm center is about 65 knot/h rising to 87 knot/h in gusts/squalls.

Maritime ports of Chittagong, Cox's Bazar and Mongla have been advised to keep hoisted distant warning signal number two (R).

All fishing boats and trawlers over north Bay have been advised to remain close to the coast so as to take shelter at a short notice.

5) No.15 14:20 Apr. 28, 1991

Warning Level :4, R2

Severe cyclonic storm with a core of hurricane wind (with estimated center pressure 978 hPa) over west central Bay and adjoining east central Bay moved NNE-wards and intensified further (with estimated center pressure 975 hPa) and was centered at 12 noon today about 820 km SW of Chittagong port (near Lat. 15.8°N and Lon. 87.7°E). It is likely to intensify further and move in a NNE-ly direction at a speed of about 20 km/h.

Maximum sustained wind within 74 km of the hurricane center is about 155 knot/h rising to 175 knot/h in gusts/squalls.

Maritime ports of Chittagong, Cox's Bazar and Mongla have been advised to lower local cautionary signal number three but instead hoist local warning signal number four (R). River ports of the regions of Chittagong, Noakhali, Comilla, Barisal, Patuakhali and Khulna have been advised to hoist riverine warning signal number two (R).

All fishing boats and trawlers over north Bay have been advised to take shelter immediately.

6) No.17 21:30 Apr. 28, 1991

Warning Level :5, R3

Severe cyclone storm with a core of hurricane wind (with estimated center pressure 975 hPa) over west central Bay and east central Bay moved slightly northwards and intensified further (with estimated center

pressure 970 hPa) and was centered at 6 P.M. today about 700 km SW of Chittagong port (Lat. 16.8°N and Lon. 88.0°E). It is likely to intensify further and move in NNE-ly direction at a speed of about 20 knot/h and may cross Chittagong-Cox's Bazar coast by midnight tomorrow night with its peripheral gusty wind touching Bangladesh coast by tomorrow morning.

Maximum sustained wind within 74 km of the storm center is about 156 knot/h rising to 185 knot/h in gusts/squalls.

Maritime ports of Chittagong and Cox's Bazar have been advised to lower local warning signal number four but instead hoist danger signal number six (R). Maritime port of Mongla has been advised to lower local warning signal number four but instead hoist danger signal number five (R). River ports of the districts of Chittagong, Noakhali, Feni, Laxmipur, Chandpur, Cox's Bazar, Bhola, Patuakhali, Barisal, Barguna, Pirojpur, Bagerhat, Khulna and Satkhira have been advised to lower riverine warning signal number two but instead hoist riverine danger signal number three (R).

Low lying areas of the districts of Cox's Bazar, Chittagong, Feni, Noakhali, Laxmipur, Bhola, Barisal, Barguna, Pirojpur, Bagerhat, Khulna and Satkhira and their off-shore islands and chars are likely to be inundated by moderate storm surge of height 10-15 feet height above normal astronomical tide.

All fishing boats and trawlers over north Bay have been advised to remain in shelter till further notice.

7) No.20 12:30 Apr. 29, 1991

Warning Level :10, R4

A severe cyclone storm with a core of hurricane wind over north Bay and adjoining central Bay moved slightly NNE-wards and intensified further (with estimated center pressure 960 hPa) and was centered at 9 A.M. today about 450 km SW of Chittagong port (near Lat. 19°N and Lon. 89°E). It is likely to intensify further and move in NNE-ly direction at a speed of about 25 knot/h and may cross Chittagong - Cox's Bazar coast close to Meghna easterly by midnight tonight.

Maximum sustained wind within 74 km of the hurricane center is about 185 knot/h rising to 210 knot/h in gusts/squalls.

Maritime port of Chittagong has been advised to keep hoisted great danger signal number ten (R). Maritime port of Cox's Bazar has been advised to keep hoisted great danger signal number nine (R). Maritime port of Mongla has been advised to keep hoisted great danger signal number eight (R).

River ports of the districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Barguna, Pirojpur,

Bagerhat, Khulna and Satkhira have been advised to keep hoisted riverine great danger signal number four (R).

Under the influence of the storm strong/vigorous wind speed of 70-90 knot/h or more likely to commence in the coastal districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Borguna, Pirojpur, Bagerhat, Khulna and Satkhira from early evening today.

Low-lying areas of the districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Barguna, Pirojpur, Bagerhat, Khulna and Satkhira, and their off-shore islands and chars are likely to be inundated by a storm surge of height 12-20 feet above normal astronomical tide.

All fishing boats and trawlers over north Bay have been advised to remain in shelter till further notice.

8) No.23 19:30 Apr. 29, 1991

Warning Level :10, R4

Severe cyclonic storm with a core of hurricane wind (with estimated center pressure 960 hPa) over north Bay and moved NNE-wards and was centered at 6 P.M. to day about 225 km SW of Chittagong port (near Lat. 20.8°N and Lon. 90.4°E). It is likely to intensify further and move in NNE-ly direction at a speed of about 35 knot/h and may cross Chittagong - Cox's Bazar coast close to Meghna estuary within next 4-6 hours.

Maximum sustained wind within 74 km of the hurricane center is about 185 knot/h rising to 210 knot/h in gusts/squalls.

Maritime port of Chittagong, has been advised to keep hoisted great danger signal number ten (R). Maritime port of Cox's Bazar has been advised to keep hoisted great danger signal number nine. Maritime port of Mongla has been advised to keep hoisted great danger signal number eight (R).

River ports of the districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Barguna, Pirojpur, Jhalokati, Bagerhat, Khulna and Satkhira have been advised to keep hoisted riverine great danger signal number four (R).

Under the influence of the storm, strong/vigorous wind speed of 70-90 knot/h affecting this evening the coastal districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Barguna, Pirojpur, Jhalekathi, Bagerhat, Khulna and Satkhira may gradually increase up to 185-210 knot/h during next 4-6 hours with the approach of the storm center close to the coast.

Low-lying areas of the districts of Chittagong - Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, barisal, Barguna, Pirojpur, Bagerhat, Khulna and Satkhira and their off-shore island and

char are likely to be inundated by a storm surge of height 12-20 feet above normal astronomical tide.

All fishing boats and trawlers over north Bay have been advised to remain in shelter till further notice.

9) No.26 22:30 Apr. 29, 1991

Warning Level :10, R4

Severe cyclonic storm with a core of hurricane wind (with estimated center pressure 940 hPa) over north Bay moved NE-wards and was centered at midnight of 29th April about 72 km SW of Chittagong port (near Lat. 22.0°N and Lon. 91.4°E) It is likely to intensify further and move in a NE-ly direction at a speed of about 35 knot/h and may cross Chittagong - Cox's Bazar coast near Chittagong within an hour.

Maximum sustained wind within 74 km of the hurricane center is about 210 knot/h rising to 235 knot/h in gusts/squalls.

Maritime port of Chittagong has been advised to keep hoisted great danger number ten (R). Maritime port of Cox's Bazar has been advised to keep hoisted great danger signal number nine (R). Maritime port of Mongla has been advised to keep hoisted great danger signal number eight (R).

River ports of the district of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Berguna, Pirojpur, Jhalakathi, Bagerhat, Khulna and Satkhira have been advised to keep hoisted riverine great danger signal number four (R).

Under the influence of the storm, strong/vigorous wind speed of 180-200 knot/h affecting in coastal districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Borguna, Pirojpur, Jhalakathi, Bagerhat, Khulna and satkhira which may increase up to 235 knot/h with the passage of the storm center.

Low-lying areas of the districts of Chittagong, Cox's Bazar, Noakhali, Feni, Laxmipur, Chandpur, Bhola, Patuakhali, Barisal, Berguna, Pirojpur, bagerhat, khulna and Satkhira and these off-shore island and chars are likely to be inundated by a storm surge of height 12-20 feet above normal astronomical tide.

All fishing boats and trawlers over north Bay have been advised to remain in shelter till further notice.

10) No.29 06:20 Apr. 30, 1991

Warning Level :3, R2

Severe cyclonic storm with a core of hurricane wind crossed Chittagong - Cox's bazar coast near Chittagong in the morning today and was centered at 6 A.M. today as a land depression about 50 km

north of Rangamati. It will move in NE-ly directions further inland and will gradually become unimportant as a weakening depression over Mizoram of India.

Under its influence fairly wide spread rain/thundershowers accompanied by N/NNE-ly gusty/squally winds of speed 55-75 knot/h will occur over the districts of Bandarband, Rangamati, Khagrachari, Chittagong, Cox's Bazar, Noakhali, Feni, Bhola, Patuakhali and Barisal. River ports shall hoist riverine warning signal number two (R).

Maritime port of Chittagong has been advised to lower great danger signal number ten but instead hoist local cautionary signal number three (R). Maritime port Cox's Bazar has been advised to lower great danger signal number nine but instead hoist local cautionary signal number three (R). Maritime port of Mongla has been advised to lower great danger signal number eight but instead hoist local cautionary signal number three (R).

All fishing boats and trawlers over north Bay have been advised to remain in shelter till noon today and then afterwards may proceed with caution keeping close to the coast.

No further special weather bulletin will be issued in this series.

JICA