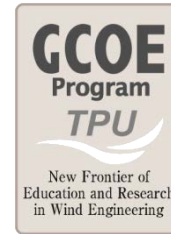


IG-WRDRR



Tornado Disaster Risk Reduction in Bangladesh

T. Hayashi	Kyoto University
Y. Tamura	Tokyo Polytechnic University
M. S. Rahman	BDPC, Bangladesh
Y. Ono	UN/ESCAP, Thailand
E. Tsunozaki	SEEDS Asia
E. English	University of Waterloo, Canada
Y. Ueda	SEEDS Asia
Y. Yamane	Tokoha Gakuen University

Thunderstorm

- Dense Cloud / **Towering Cumulonimbus**
 - Lightning & Thunder
 - Heavy Rain
 - Hail
 - Strong Gusty Winds
- Tornado**
- Waterspout**
- Downburst / Microburst**
- Gust Front**



Courtesy of Steven Love/Fotolia

- Severe Local Storm
- Local Convective Storm

Tornado Disasters in Bangladesh

Statistics in 36 years (1961 – 1996)

- Total Fatalities: 10,766
- Total Number of Tornadoes Recognized: 199
- ◆ Fatalities > 100 people : 20 Tornadoes
- ◆ Fatalities > 500 people 7 Tornadoes

Ex.

- ◆ Tangail Tornado 1996: 700 Fatalities
- ◆ Manikganj Tornado 1989: 1,170 Fatalities

Tornado Disasters in Bangladesh

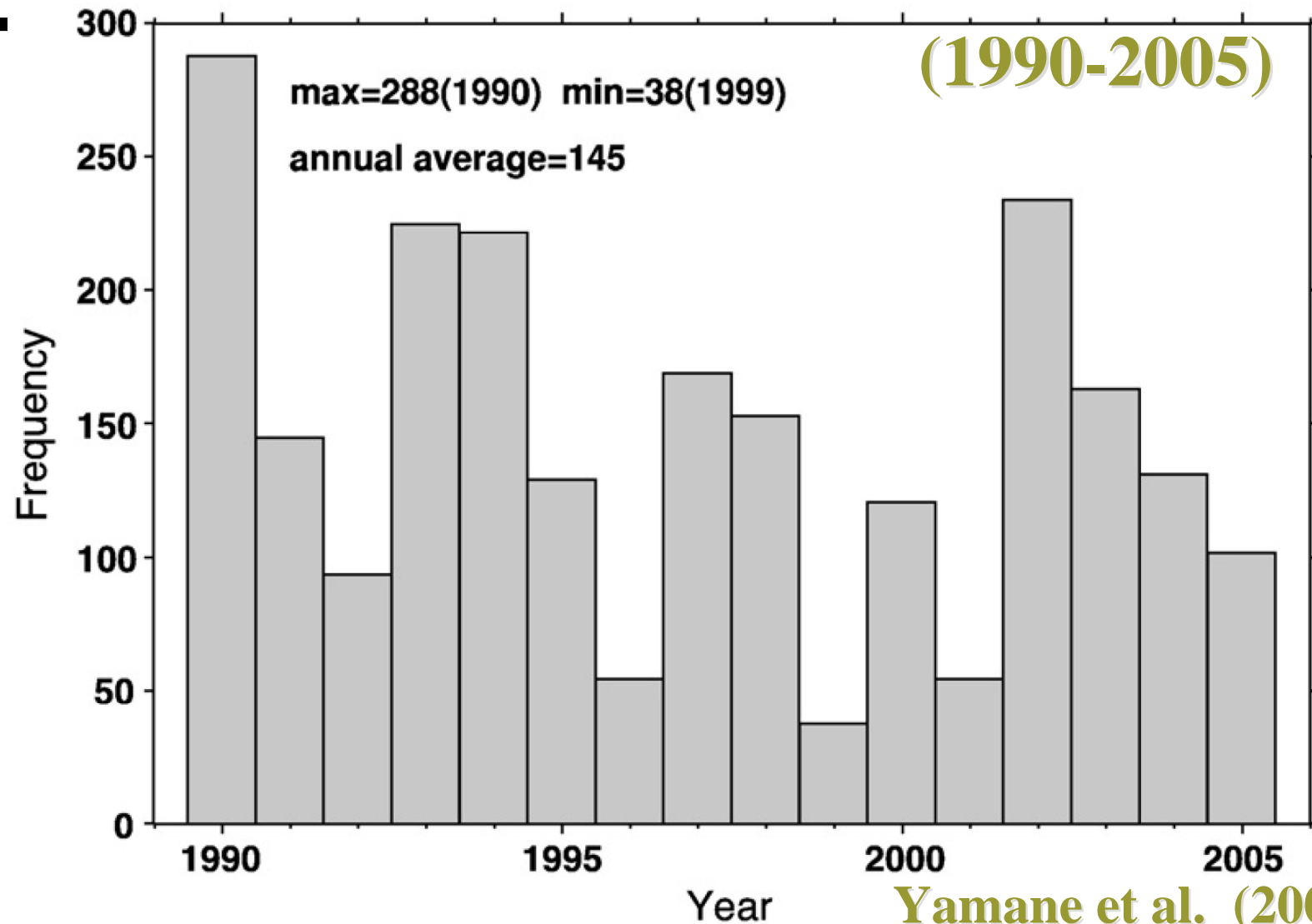
Statistics in 36 years (1961 - 1996) **300/year**

- Total Fatalities: **10,766**
- Total Number of TORNADOS Recognized: **199**
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Ex.

- ◆ Tangail Tornado 1996: **700 Fatalities**
- ◆ Manikganj Tornado 1989: **1,170 Fatalities**

Annual Frequency of Tornado-like Storms in Bangladesh



Cooperative Actions for Disaster Risk Reduction

*- Cooperative Actions for Disaster Risk Reduction -
(CADRR)*

ISWE4, March 4-6, 2009

*U Thant International Conference Hall & Elizabeth Rose Conference Hall
United Nations University Headquarters, Tokyo, Japan*

March 4 – 6, 2009, UN University, Tokyo

Co-organized by

International Association for Wind Engineering (IAWE)

United Nations University (UNU)

United Nations International Strategy for Disaster Reduction (UN/ISDR)

Secretariat

Asian Disaster Reduction Center (ADRC)

Tokyo Polytechnic University (TPU)



Visit to Tornado Affected Villages in Bangladesh

IG-WDRR



Tangail District, August 17, 2009

International Forum on Tornado Disaster Risk Reduction for Bangladesh

– To Cope with Neglected Severe Disasters –
December 13-14, 2009, Dhaka, Bangladesh





December 13-14, 2009, Dhaka, Bangladesh

International Forum on Tornado Disaster Risk Reduction for Bangladesh

Co-Organizers:

- **Government of the People's Republic of Bangladesh**
 - **Disaster Management Bureau (DMB)**
 - **Ministry of Food and Disaster Management (MFDM)**
 - **Bangladesh Meteorological Department (BMD)**
 - **Ministry of Defense**
- **Bangladesh Disaster Preparedness Center (BDPC)**
- **Tokyo Polytechnic University Global COE Program (TPUGCOE)**
(Sponsored by Ministry of Education, Culture, Sports, Science and Technology, Japan)
- **International Association of Wind Engineering (IAWE)**

International Forum on Tornado Disaster Risk Reduction for Bangladesh

December 13-14, 2009, Dhaka, Bangladesh
Program

- **Inauguration Ceremony**
- **Introductory Session**
 - Voices from tornado affected people and district officials
- **Governance and Policy Making**
- **Public Awareness and Education / Finance and Community Planning**
- **Opening for Technical Sessions**
- **Meteorology and Climatology**
- **Early warning system in Japan and Bangladesh**
- **Wind Engineering, Household and Community Storm Shelter, and Risk and Vulnerability**
- **Closing (Chair's Summary)**

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International Forum on Tornado Disaster Risk Reduction for Bangladesh

December 13-14, 2009, Dhaka, Bangladesh

Objectives

- **to understand severe local storm disaster risks in Bangladesh**
- **to raise awareness of the risks at local, national, and international levels,**
- **to develop a strategy to reduce the risks**

International Forum on Tornado Disaster Risk Reduction for Bangladesh

December 13-14, 2009, Dhaka, Bangladesh

Outcomes

Aid in Helping

- the Government of Bangladesh to adopt policies and development planning to reduce risks from severe local storms

Stimulate

- donor agencies and NGOs to conduct specific projects to reduce the disaster risks

International Forum on Tornado Disaster Risk Reduction for Bangladesh

– To Cope with Neglected Severe Disasters –
13-14 December 2009, Dhaka, Bangladesh

IG-WDRRR

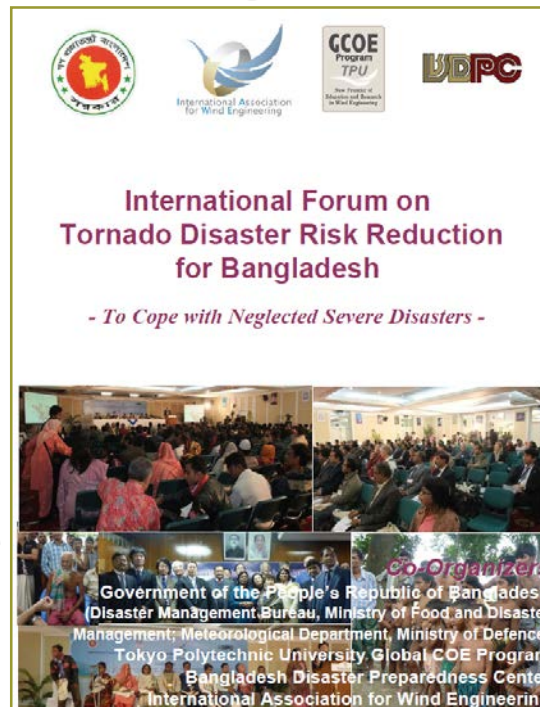
English

Bengali

March 2010

- Press Release
- Chair's Summary
- Position Paper
- Recommendations

**Bangladesh Government,
JICA, IFRC, etc.**



Mini-Workshop on Tornado Shelter for Bangladesh

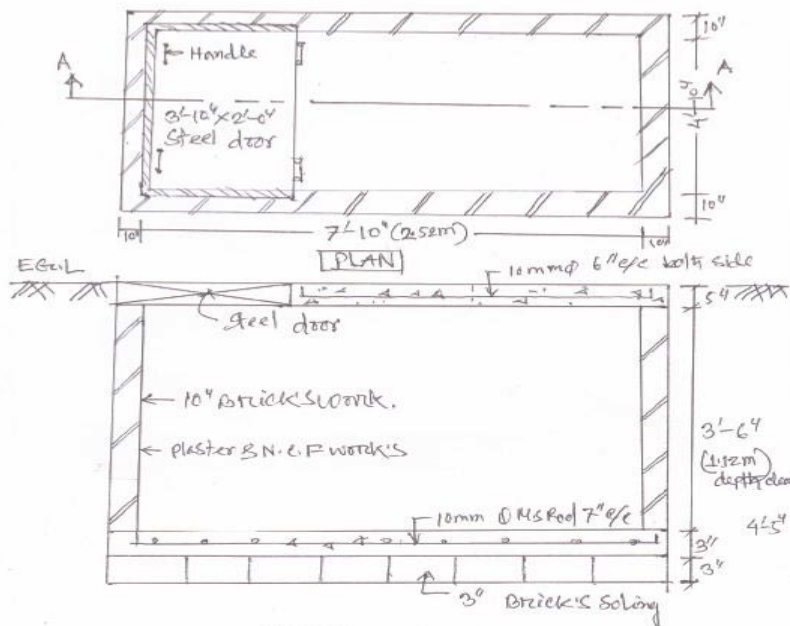
January 25, 2011: Visit to an Affected Village
January 26, 2011: Meeting on In-house Type Small Shelter (Dhaka)



Saturia Union Porishad in Manikganj District, January 25, 2011

Mini-Workshop on Tornado Shelter for Bangladesh

January 25, 2011: Visit to an Affected Village
January 26, 2011: Meeting on In-house Type Small Shelter (Dhaka)



SECTION - A-A

Preliminary Design

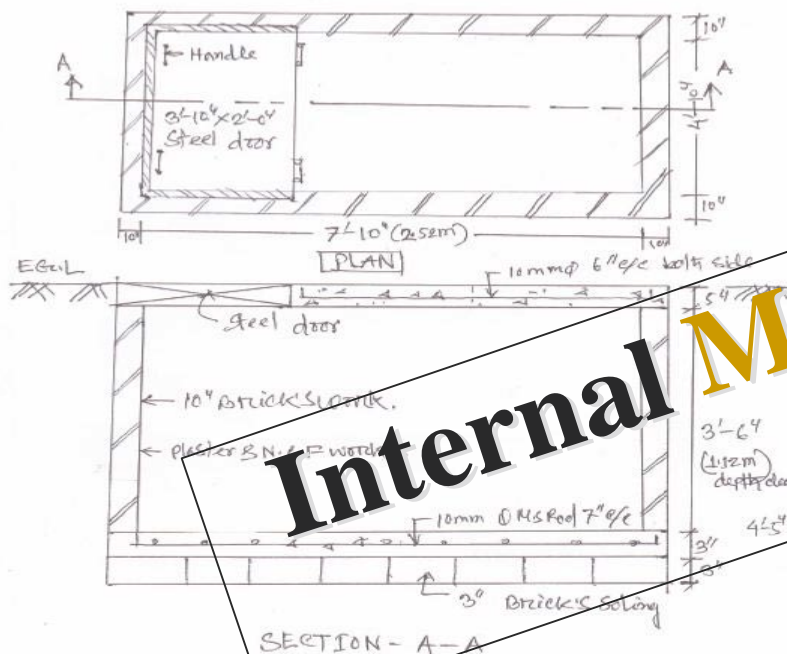
Date: 26.01.11

1. Earth cutting = $260 \times 4 = 1,040 \text{ f}$
 2. Sand filling = $26 \times 15 = 390 \text{ f}$
 3. 10" Bricks work = $77 \times 91 = 7007 \text{ f}$
 4. R.C.C work = $22 \times 20 = 440 \text{ f}$
 5. Red (M.S) = $55 \times 58 = 3,190 \text{ f}$
 6. Soling = $27 \times 22 = 594 \text{ f}$
 7. Plastering work = $230 \times 15 = 3,450 \text{ f}$
 8. N.C.F work = $230 \times 8 = 1,840 \text{ f}$
 9. Steel door = $8 \times 270 = 2,160 \text{ f}$
 10. Materials saving = $\text{---} = 2,000 \text{ f}$
- Total = 26,071 f
10. Mobilization purpose bathous = $4,000 \text{ f}$
- Total = 30,071 f

Cost Estimation

Mini-Workshop on Tornado Shelter for Bangladesh

January 25, 2011: Visit to an Affected Village
January 26, 2011: Meeting on In-house Type
Small Shelter (Dhaka)



Preliminary Design

Date: 26.01.11

1. Earth cutting	=	260 x 4 = 1040	₹
2. Sand filling	=	2 x 10 = 20	₹
3. 10" Bricks work	=	77 x 10 = 770	₹
4. Rec work	=	22 x 20 = 440	₹
5. Plaster work	=	55 x 58 = 3190	₹
6. Steel door	=	27 x 22 = 594	₹
7. Plastering work	=	230 x 15 = 3450	₹
8. N.C.F. work	=	230 x 8 = 1840	₹
9. Steel door	=	8 x 270 = 2160	₹
10. Materials entry	=	— = 2000	₹
		Total = 26071	₹
10. Mobilization purpose		8000	₹
		Total = 30,071	₹

Cost Estimation

IG-WRRR

Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Schedule

06 January	Friday	- Arrival of EE	Pan Pacific Sonargaon Hotel (Phone 880 2 8111005)
07 January	Saturday	- Arrival of TH, YO, YT, and YU	Pan Pacific Sonargaon Hotel (Phone 880 2 8111005)
08 January	Sunday	- Planning meeting at Bangladesh Disaster Preparedness Center (BDPC) Office - Meeting at Disaster Management Bureau (DMB) - Meeting at Bangladesh Meteorological Department (BMD) - Lunch at BDPC Office - A courtesy visit to Japan International Corporation Agency (JICA)	
09 January	Monday	- Drive to Elenga (Tangail) Elenga Resort (6 km from Rampur village) till Jan 11 - Meeting with community at Rampur Primary and High School - Meeting with the Chairman and Members of the Balla Union Parishad - Meeting with the Chief Executive of the Sub District (Kalihati) - Visiting houses where construction works of MSR are going on - Meeting with a local engineer	
10 January	Tuesday	- Meeting with house owners and the local engineer	
11 January	Wednesday	- Construction of MSR	
12 January	Thursday	- ditto	Jamuna Resort (20 km from Rampur village)
13 January	Friday	- ditto - Drive back to Dhaka	Pan Pacific Sonargaon Hotel
14 January	Saturday	- Review meeting at BDPC office	
15 January	Sunday	- Meeting at BDPC office and Departure of the Team Members	

Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Planning & Review Meetings at BDPC January 8 & 14, 2012



Schedule		
06 January	Friday	- Arrival of EE
07 January	Saturday	- Arrival of TH, YO, YT, and YU
08 January	Sunday	- Planning meeting at Bangladesh Disaster
		- Meeting at Disaster Management Bureau
		- Meeting at Bangladesh Meteorological De
		- Lunch at BDPC Office
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		- Meeting at BDPC office and Departure of



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Visit to Disaster Management Bureau (DMB) January 8, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Visit to Bangladesh Meteorological Department (BMD) January 8, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Visit to JICA January 8, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Meeting at Primary & High School Rampur, January 10, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Meeting on MSR Design with Engineer Rampur, January 10, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Discussions with Village People Rampur, January 10 - 13, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Construction of MSR1 Rampur, January 9 - 14, 2012



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Construction of MSR2 Rampur, January 9 - 14, 2012

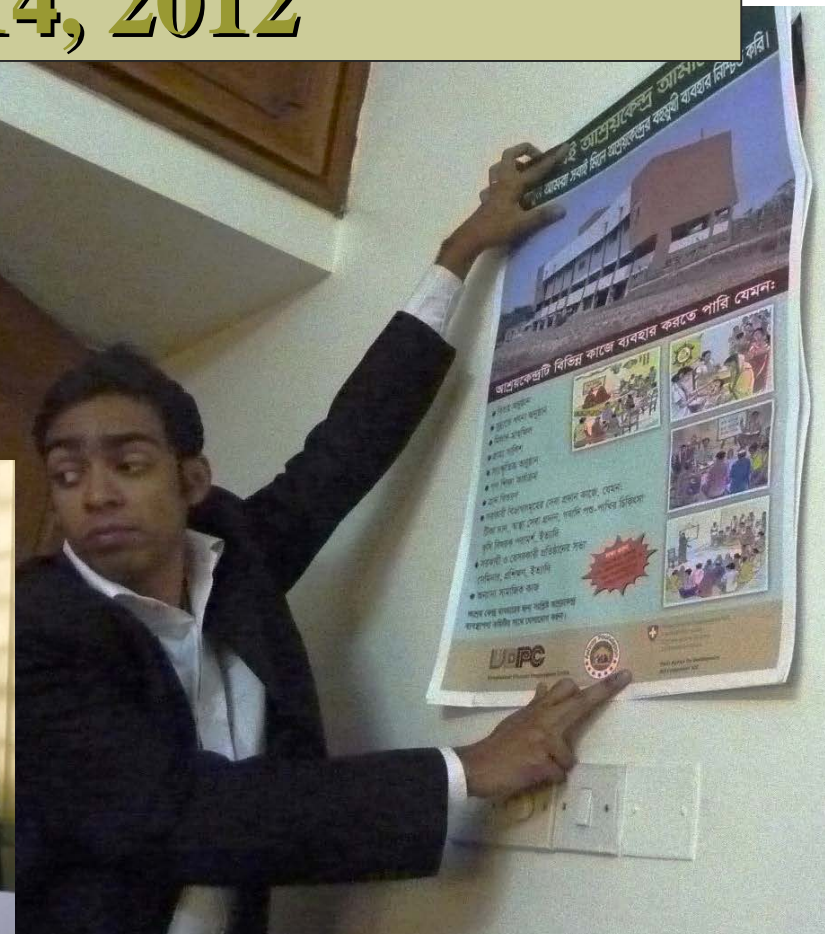


Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Planning & Review Meetings at BDPC January 8 & 14, 2012



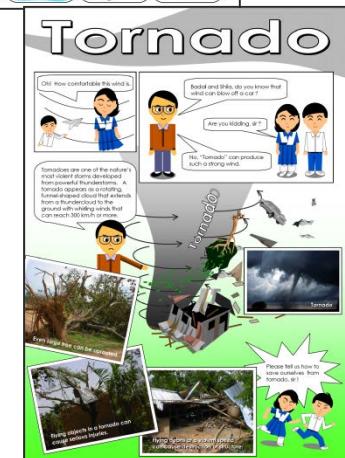
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14 January	Saturday	- Review meeting at BDPC office
15 January	Sunday	- Meeting at BDPC office and Departure of



Mini-Safety Room (MSR) Project in Bangladesh (January 8 - 15, 2012)

Future Plan

- **Knowledge Dissemination and Education on Tornados and Risk Reduction in Bangladesh**
 - Poster
 - Lectures at Schools/Villages
- **Maintenance and Serviceability Check of MSRs (December, 2012)**



Thank you !

