

Preparing for Typhoon in Vietnam



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Vietnam is one of the countries most affected by wind and flood damages in Southeast Asia. In particular, the central region is prone to tropical cyclones including typhoon; the synergistic effect of the seasonal monsoons and the Annan Mountains resulted in heavy rainfall frequently, causing wind and flood damages and landslides every year. Thanks to improved accuracy of weather forecasts and development of communication technology, it is now easier to forecast approach timing, paths and scales of typhoons and obtain the information. **Preparing and planning with a timeline are extremely important**, and it is crucial to reduce the risk of business interruption and damage by adhering to perform them.

In this article, we outline general information of typhoons, as well as standard points of pre-checks aimed at preparing for risks. Please refer this article to reinforce your existing emergency response system.

Editor's note: The content is based on the information at the time of writing this article.

1. Outline of Typhoon

“Typhoon”, “Cyclone” and “Hurricane” are common names for tropical cyclones with maximum sustained wind of 32.7m/s (118km/h) or more [Table 1]. They are all the same phenomenon but are given different names depending on where they appear. If the area of formation is the Northwest Pacific Ocean, it is a “Typhoon”. If that is the Indian Ocean & Southwest Pacific Ocean, it is a “Cyclone”, and it is a “Hurricane” if that is the North Atlantic Ocean & Northeast Pacific Ocean. (In Japan, tropical cyclones with maximum sustained wind of approx. 17m/s or more are called “Typhoon”.)

Names for tropical cyclones adopted by the ESCAP/WMO Typhoon Committee for the Northwest Pacific Ocean and South China Sea have been used as an international name since 2000, while “typhoon numbers” which are numbered only for tropical cyclones approaching South China Sea are used in Vietnam.

The number of typhoons is 25.3 per year on average (1990-2019 average), and the lifespan (the period from the occurrence of typhoons to the transition to tropical cyclones or extratropical cyclones) is 5.3 days on average (1981-2010 average).

Typhoons are formed by the formation of cumulus clouds over warm ocean waters of the tropics (around 5 to 20 degrees north latitude). Tropical cyclone is one of the most destructive natural disasters. The main damage is caused by “Wind” and “Water”. When a typhoon make landfalls or approaches, storms (strong winds), storm surges, high waves will cause collapses of signages, signboards and trees etc., lightnings, damages to buildings (such as roof blown off), floods due to heavy rains, inundation, roads and bridges washed away, landslides and mudslides.

According to “Integrated Assessment Report on Observation, Forecast and Impact of Climate Change 2018” published by the Ministry of the Environment, Japan in 2018 and the Fifth Assessment Report of the IPCC (Intergovernmental Panel on Climate Change), the frequency of tropical cyclones across the globe is likely to decrease or remain unchanged in the future, while at the same time the maximum wind speed of tropical cyclones and the amount of rainfall in global average are likely to increase. Furthermore, they pointed out that the intensity of tropical cyclones such as typhoons may increase with the progress of global warming, so it is crucial to assume that disasters will become more severe as a whole.

[Table 1] Standard Classification of Tropical Cyclones

Standard Classification of Tropical Cyclones		
Max. Sustained Wind Speed (10 min Ave.)		International Classification (Code)
m/s	km/h	
< 17.1	< 63	Tropical Depression (TD)
17.2 - 24.4	63 - 87	Tropical Storm (TS)
24.5 - 32.6	88 - 117	Severe Tropical Storm (STS)
≥ 32.7	≥ 118	Typhoon (T or TY)

Reference: ESCAP/WMO Typhoon Committee

2. Characteristic of Typhoon in Vietnam

Due to its location in the tropics and subtropical zone, Vietnam faces impacts from both typhoons in the Northern Pacific and severe tropical cyclones near the equator. Annually, typhoons in Vietnam normally occurs during June through the end of November (most often from September to October), which coincidentally is the monsoon season, resulting in the extremely heavy rainfall.

According to the data compiled by us based on various publications, the number of typhoons landing on Vietnam was 3.4 per year on average (1970-2019 average). However, when limited to the last 10 years (2010-2019), that showed an increasing tendency, 3.7 per year on average. ERIA (Economic Research Institution for ASEAN and East Asia) reports that Vietnam is dominant in the list of cities at risk from storm surges at the city level, and estimates that Vietnam is hit by 4.3 storms per year.

According to the “Disaster Risk Mapping in Viet Nam” presented by the Ministry of Natural Resources and Environment, Vietnam in 2018, it pointed that the following trends can be seen in Vietnam from past statistics (1958-2014).

- ✓ Number of strong typhoon increases
- ✓ Extreme rainfall increased in the South Central and Central Highlands
- ✓ Number of flash flood increases
- ✓ Sea water level increased (3.1mm/year)

The major typhoons and tropical cyclones that had hit Vietnam in the past are summarized in Table 2.

It is said that the central region of Vietnam is vulnerable to typhoons; however as shown in *Table 2*, many typhoons and tropical cyclones have hit the northern and southern regions as well. Floods and landslides occur in mountainous areas, floods occur in cities with insufficient drainage facilities, and coastal areas suffer from strong winds, storm surges, and heavy rain caused by typhoons. Tropical cyclones and its disasters associated with them are relatively well known in Vietnam due to the frequent damages occurring in various areas, however the reality is that a lot of damages are generated even when a lower scale tropical cyclone such as “Tropical Storm” hit Vietnam.

Damages can occur even in areas far away from the coastline. Hence, once you receive news of a pending typhoon, it is important to prepare measures in advance by referring to a forecast provided by highly reliable intelligence agencies such as NCHMF (National Center for Hydro-Meteorological Forecasting).

[Table 2] Major Typhoons & Tropical Cyclones hit Vietnam

Occurrence		International Classification	Names	Main Damaged Area	Fatalities	Damages (USD)
Year	Month					
2021	9	Tropical Storm	Dianmu	Central	Reported 8	N/A
2020	11	Typhoon	Vamco	Central	Over 100	418million
	10	Typhoon	Molave	Central	Over 110	742million
2019	8	Tropical Storm	Wipha	North	27	44million
2018	11	Tropical Storm	Toraji	South	20	53.9million
	8	Tropical Storm	Bebinca	North	10	57.6million
	7	Tropical Storm	Son-Tinh	North	27	287million
2017	11	Typhoon	Damrey	Central / South	110	1 billion
	9	Typhoon	Doksuri	North / Central	12	720million
	7	Severe Tropical Storm	Talas	North	14	70.4million
2016	10	Severe Tropical Storm	Aere	North / Central	35	112.1million
	9	Tropical Storm	Rai	Central	12	37million
	8	Tropical Storm	Dianmu	North	16	157,000
2015	9	Tropical Storm	Vamco	Central	11	13.2million
2014	9	Typhoon	Kalmaegi	North	13	944,000
	7	Typhoon	Rammasun	North	28	6million
2013	11	Typhoon	Haiyan	North	13	N/A
2009	9	Typhoon	Ketxana	Central	163	785million
2007	10	Typhoon	Lekima	North / Central	Min. 77	130 million
	12	Typhoon	Durian	South	Min. 98	400million
2006	10	Typhoon	Xangsane	Central	71	629million
	5	Typhoon	ChanChu	Central Coast	21 (Missing 220)	N/A
1997	11	Tropical Storm	Linda	South	> 3,000	385million

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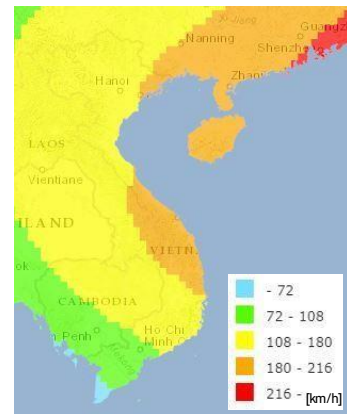
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3. Wind Hazard

Figure 1 shows the wind hazard map (return period: 100 years) due to a typhoon issued by GAR (Global Assessment Report on Disaster Risk Reduction).

Wind hazards are usually considered based on the return period of wind hazards. The map shows that the risks in the central region is relatively high. Although it is considered to have a medium wind hazard at a global level, the wind hazard is one of the risks requiring caution because there are many cases where damage occurs in Vietnam, as described in Section 2.



[Figure 1] Wind Hazard Map (GAR)

4. Forms of Damage Caused by Typhoon

Expected forms of damage caused by wind and rain brought by typhoons are as follows;

- ✓ Damage of buildings and outdoor facilities (breakage/peeling of roofs, shutters come off from the guide rails, breakage of windows and accessory facilities such as ducts, etc.)
- ✓ Scattering of outdoor objects, breakage of buildings/outdoor facilities due to flying objects
- ✓ Water damage due to rainwater infiltration from building damage.
- ✓ Inundation (even if the flood level is low, there is a case that water flows into pits and it causes serious damage).
- ✓ Water leakage from roofs caused by overflowed water due to clogged roof drainage, or overflow of water (when rainwater drainage is in the building).

5. Checklist

Standard points of pre-checks aimed at preparing for risks are outlined below. Preparing and planning with a timeline are extremely important.

We hope you utilize the checklist on the next page in preparation for the Typhoon season.

Note: This article is an excerpt from our past article issued in 2020.



Checklist (for Typhoon)

Routine Countermeasures

1. Emergency Response Team (ERT) & Education/Training

- Reconfirmation of ERT during working hours, for off-days and during nights
- Display of ERT organization chart and responsible persons in charge
- Formation of Self-Inspection Team
- Confirmation of emergency contact list (both internal and external)
- Reconfirmation of inspection record system and its reporting system

2. For buildings and fastenings of their members, confirmation of rusting/deterioration, repair/reinforcement of fixtures and cleaning (Not only the main building but also the attached buildings and auxiliary structures such as storerooms shall be included in the confirmation)

- Roofing materials
- Steel shutters (including their guide rails) and doors
- Chimneys, Ventilators
- Skylights
- Upright gutters, horizontal gutters and catch basins (check of current condition and clogging)
- Clearing clogging of side ditches and drains (especially the drainage points flowing towards outside)
- Exterior wall materials
- Fixtures (window frames, etc.)
- Ducts, Ventilation openings
- Presence of rain leak

3. Measures against rainwater and inundation

- Outdoor electrical equipment
 - Pits for equipment
 - Power distribution panels and substation
 - Other critical equipment for your operation such as utility
 - Production and manufacturing equipment
 - Control panels for power generators
 - High-voltage power receiving & transforming facilities
- Consider the following measures if there is a possibility of flooding/inundation.
- ✓ Raised floors
 - ✓ Confirmation of suppliers for waterproof sheets/sand bags
 - ✓ Installation of flood walls
 - ✓ Securing emergency power supply etc.

4. Measures against trees uprooted and/or falling branches

- Pruning of branches
- Overhead electric cables
- High-voltage power receiving & transforming facilities

5. Disasters from neighboring areas (Identification of dangerous areas)

- Collapse of steep sloping land
- Slope face collapse
- Falling rocks
- Debris flow

6. Measures against lowland (Embankment etc.)

- Prevention of inundation
- Drainage measures

Advance Preparation (It is important to set timeline how many days before you will start to take the actions.)

1. Instruction to employees

- Employees planning to work / Determination whether employees should come to the premises or not
- Securing of responsible persons
- Supplemental employees who are required for supports

2. Prevention of electric and water leakage

- Measures to suppress water intrusion
- If required, seal up the gaps around window panes and doors (Use blankets or tapes)

3. Protection of finished goods and equipment

- Arrangement of waterproof sheets and sandbags
- Preparation of rags etc.
- Moving away from the windows
- Moving to higher places not affected by inundation

4. Care of outdoor gears

- Fixation of inner doors and movable furnishings
- Reduction and fixing of high-piled pallets
- Relocation small articles etc. to inside the building
- Pruning of tree branches etc.

5. Checking emergency equipment

- Dry cell batteries, Water drainage pumps, radio
- Portable power generator
- Means of transportation (rubber boat, if necessary) as well as communication tools
- Torches, Emergency foods, Helmets, Blankets

6. Advance arrangement

- Constriction companies
- Equipment firms, especially electric equipment supplier

Instruction on the day (It is important to set judgment criteria to start actions)

- Collecting data such as information issued by Government or meteorological information
- Decision of production suspension time and workplace closing time
- Reporting of decisions to employees and related parties
- Evacuation instruction when there is a risk of disaster from the neighborhoods

For your reference: Post-Typhoons measures

- Confirmation of employees' damage situation
- Confirmation of damaged situation of buildings and equipment
- Access control to the affected areas damaged by cyclones
- Restrictions on the use of electrical equipment in the water damaged areas
- Reporting to management and decision of restoration procedures
- Factory patrol by responsible persons