

# ASIA AND THE PACIFIC TRANSPORT FORUM 2024 CLEAN TRANSPORT FOR ALL

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# Strategizing Climate Resilience and Disaster-Ready Transport Systems in Japan



Hello!

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*Disclaimer: The views expressed are those of the presenter and do not reflect the official view of the Embassy or the Government of Japan. Images courtesy of Ministry of Land, Infrastructure, Transport and Tourism of Japan unless otherwise stated.*





## Rapid recovery of Joban Expressway after 2011 Great East Japan Earthquake (Magnitude 9.0)



March 11, 4:30pm  
\*two hours after the earthquake

**Only 6 days**

March 17, 5pm

# Japan is at High Risk of Disasters

- Earthquake
- Tsunami
- Typhoon
- Torrential rain
- Volcanos
- Heavy snow

Disaster-resilient transport network is **critical for saving lives and economies** in disaster-prone areas/countries.



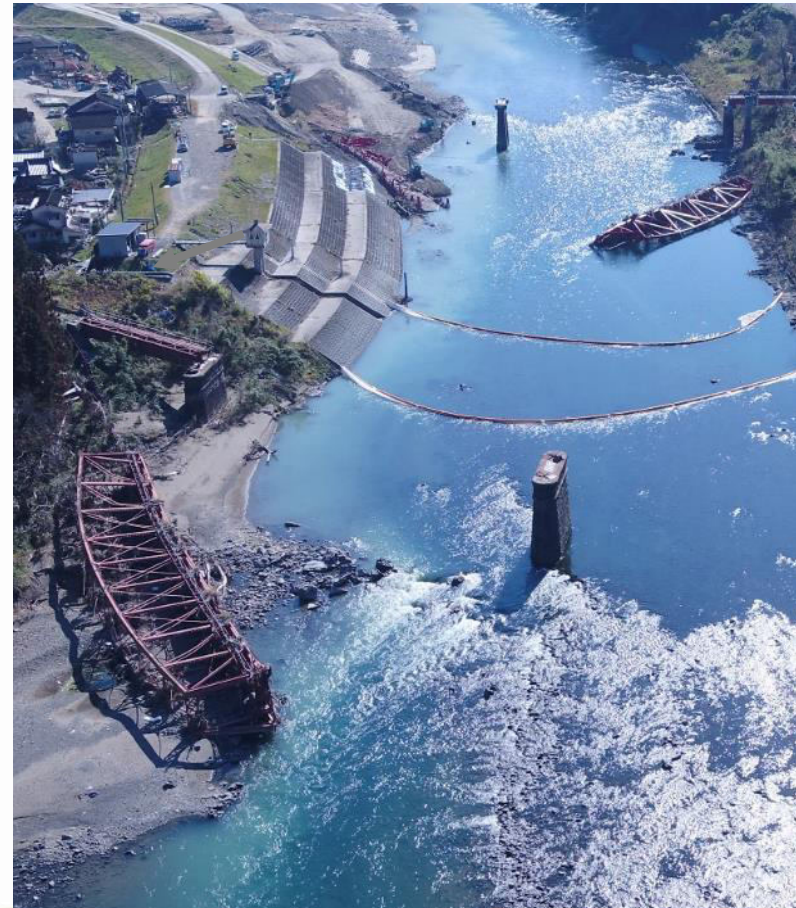
## Damages by Torrential Rain / Typhoon



Mudslides by torrential rain in August, 2022



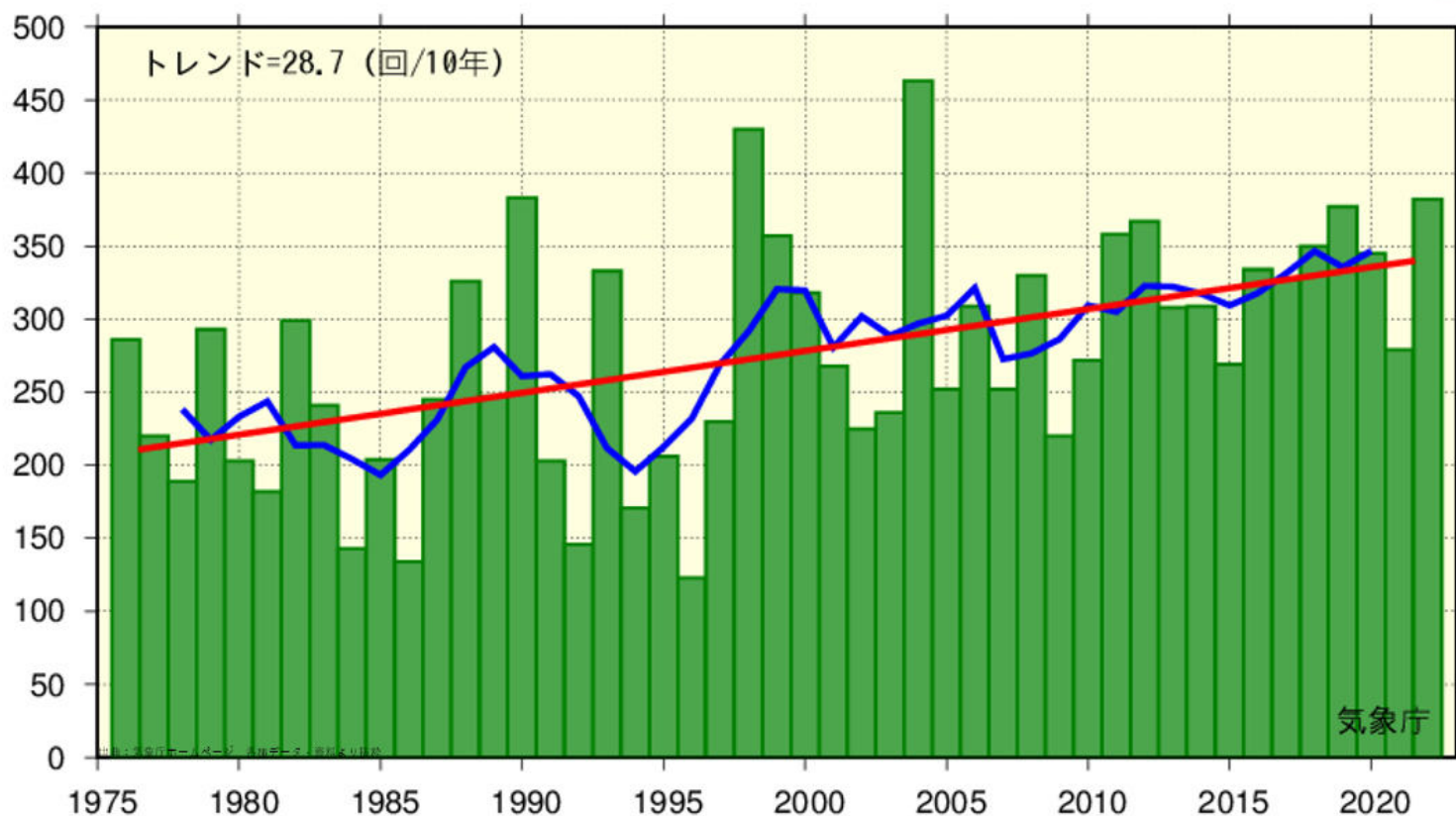
Road collapse after Typhoon Nanmadol in September, 2022



Washed-out bridges after the flood caused by torrential rain in August, 2020

# Rainfall is Getting Heavier

Recorded number of heavy rain (>50mm/hour) per 1,500 observation points in Japan



Source: Japan Meteorological Agency

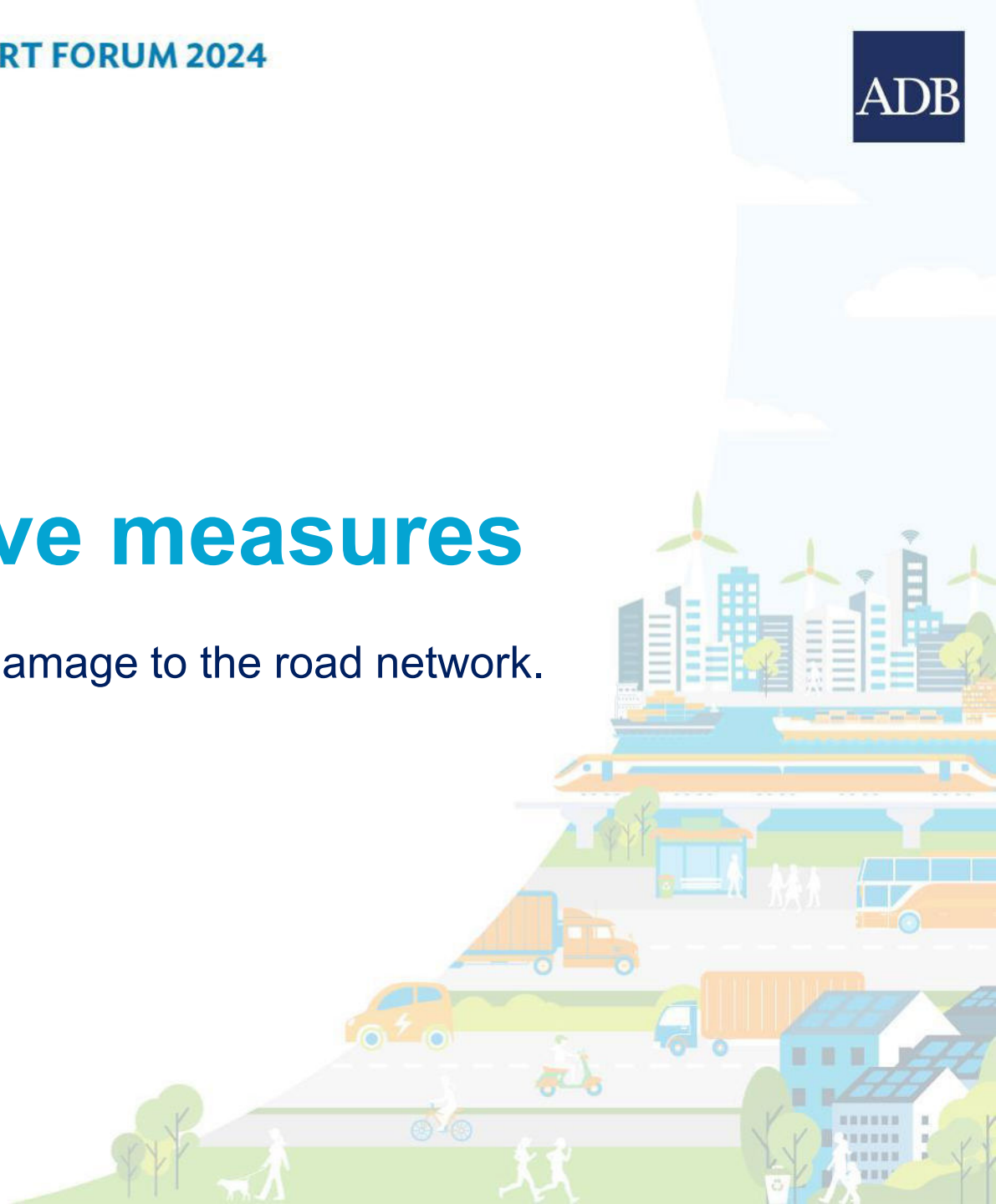
## Key points: for a more resilient road network

- 1. Preventive measure:** to minimize direct damage to the road network.
- 2. Disaster response framework:** to restore functionality as early as possible in order to save lives and minimize impact to the economy.
- 3. Reflection and Improvement:** to prepare for future disasters.



# 1. Preventive measures

Minimizing direct damage to the road network.







# Preventive Works on Vulnerable Sections

**Preventive works** to be conducted based on the result of the inspections.



Slope protection by greening mats



Slope protection with concrete frame and stabilization anchor



Rockfall protection wall/fence



Rock net



Rock stabilization by wire rope



Rock shed



# New Technologies

New technology allows **more efficient and effective risk assessment.**

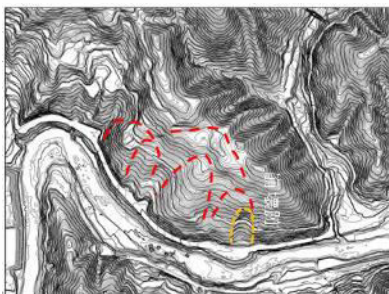
Topographical analysis by laser scanning technology



Conventional topographic map



Aerial photograph

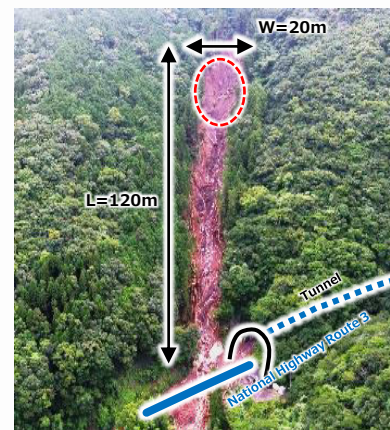


Topographic map by laser scanning

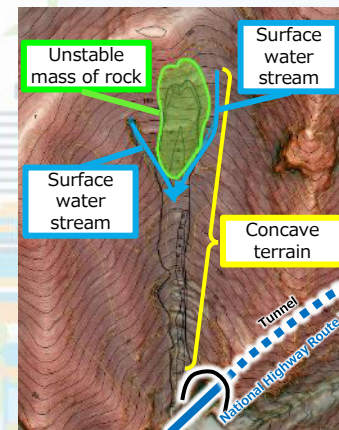


Microtopographic image

Example: National Highway Route 3 (Kumamoto Pref.)



Landslide originating from outside the road area.



Topographical features found with laser scanning.

# Road Network Redundancy

- **Redundancy** is becoming more important to **secure road network continuity** against the disaster risk

Ex: Torrential rain by Typhoon *Prapiroon/Florita* in March, 2021



Damaged National Highway Route 1  
(Closed for 4days & 7hours due to landslide)



Passable E1 Meishin Expressway  
(No damage)

Regional road planning with consideration of network redundancy.





## 2. Disaster Response

Recovering road function as early as possible in order to save lives and minimize impact to the economy.





# Inter-Regional Support - TEC-FORCE -

- Affected area often faces **limitation in personnel / equipment** in case of large-scale disaster.
- More than **15,000 technical staffs nationwide** are designated for emergency support team.
- The team (TEC-FORCE) will be **deployed for response works and technical assistance**.



Technical assistance on on-site damage investigation and rescue work

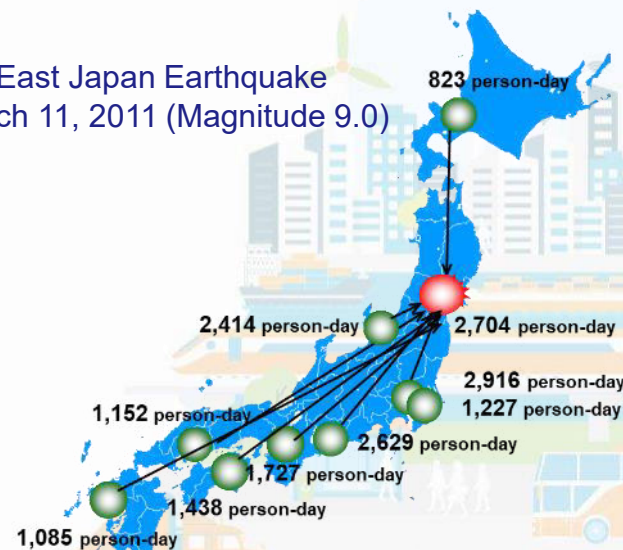


Situation investigation by helicopter



Equipment supply  
(e.g., satellite communication system)

Great East Japan Earthquake  
in March 11, 2011 (Magnitude 9.0)



The next day of the earthquake, 400 TEC-FORCE members were deployed to the affected area. A total of 18,155 person-day were engaged.

# Cooperation with Local Construction Companies

Local construction companies are invaluable partners in disaster response and recovery.

Cooperation agreement between local construction companies/associations and national/local agencies

Procurement guide for disaster recovery work



Local construction companies working for debris removal

**地方公共団体の取組事例**

**発注者体制の整備**

- ① 発注者体制の整備
  - ① 発注者体制の整備 (都市再生機構、Uターン等)
  - ② 民間へのCM及び積立支援・現場監督体制等の構築
- ② 発注の工夫
  - ① 全国発注案件の大型化・(D+E)化による取組の促進
  - ② 全国発注案件を複数年度にわたって実施
- ③ 労働者の確保
  - ① 関係団体に要する共同作業員に精上げ (8千)

**発注者体制の整備 (①、②) いのちのつなぎ型発注**

Uターン等とは、前職を継承し、発注期間延長、土木・土木技術継承助成金は、積立支援と現場監督確保

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**地方公共団体における復旧・復興事業の取組事例集**

近年、全国の地方公共団体では、公共事業を効率的に推進し、持続可能なまちづくりを実現するために、発注者体制の整備が重要と認識されています。本集では、地方公共団体の取組事例をまとめた上で、発注者体制の整備が重要な役割を果たしていることを示しています。

復旧・復興事業の円滑な実施を確保するため、入札不調や発注の状況等への対応に注力するとともに、国・地方公共団体と地方の事業者が連携して取組を行うことが、発注者体制の整備に重要な役割を果たしています。

当事業では、地域の復興や事業の推進に貢献し、様々な工夫を行って円滑な実施を実現している地方公共団体の取組が数多くあり、ご紹介いたします。

2017  
多岐な入札方式による事業推進 - 建設委員会



# Inter-Agency Coordination

- Basic Act on Disaster Management and Disaster Management Plan specify each agency's role.
- **Coordination among stakeholders** (national agencies, local government, transport/utility companies, NGOs, etc.) is critical for faster and smoother response.

## Joint training



### Example:

- Ministry of Land, Infrastructure Transport and Tourism
- Ground Self-Defence Force
- Prefectural Government
- Local construction company's association

## Coordination in disaster response



### Example:

- Ministry of Land, Infrastructure Transport and Tourism
- Ministry of Economy and Industry
- Prefectural Government
- Electric Power Company / Grid Company



# New Technologies

New technology allows **faster damage assessment** and **response work**.

## Utilization of SNS data



## Satellite remote sensing data

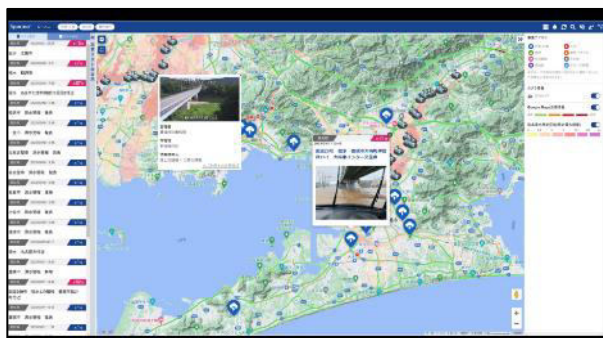


Flooded area analysis  
(Typhoon No.2, 2023.3)

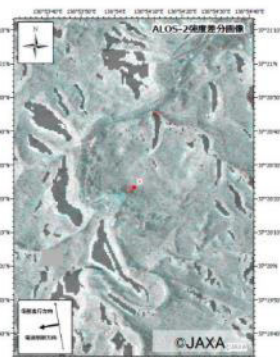
## Remote controlled heavy machinery



Large-scale slope stabilization work  
(Kumamoto Earthquake, 2016)



Damage report by Spectee Pro  
(Source: JICA, Spectee Inc.)



Landslide area analysis  
(Noto Earthquake, 2024.1.1)

# 3. Reflection and Improvement

Preparing for future disasters.





# Preparing for Future Disasters

Continuous effort in reviewing actions taken and updating related laws/technical guidelines

Revision of laws/  
technical guidelines

Summary of recent disasters and response

**令和4年7月14日・令和4年8月3日からの大雨による被害と対応**

○山形県米沢市において道路陥没により通行止め発生。山形・福島両県からの応急復旧の要請を受け、国の電報代行による応急復旧を実施。  
 ○令和4年8月3日からの大雨により、東日本各地で鉄道施設が被災。事業者に対して補助等を行い、災害からの早期復旧を支援。

**【国の電報代行による災害復旧】** 【鉄道軌道整備法に基づく復旧支援】

**【対応】**  
 ○西暦191号の地方において通行止め発生  
 ○山形・福島両県の応急復旧

**12月17日・1月20日からの大雪による被害と対応**

○1月24日から25日にかけて、JR西日本東海道線において、当初の予想を超える降雪により、最大15本の駅間停車による長時間にわたる乗客の滞り込みが発生。  
 ○令和4年12月18日からの豪雪に伴い車両滞留が発生。12月23日からの凍雪では、躊躇ない通行止めを徹底し、雪中降雪中にて早期に交通開放。  
 ○令和4年12月22日からの暴風雪による大規模停電に対して、発電所までの輸送ルートを共有し、除雪等を支援。

**【鉄道立ち往生への対応】** 【大雪時の道路交通確保】 【停電時の早期復旧に向けた電力会社との連携】

**【被害】** 【被害】 【被害】

**令和4年度以降の主な災害**

○令和4年度には、7月14日・8月3日からの大雨や台風第14号・第15号、12月17日・1月20日からの大雪等により、全国各地で甚大な被害が発生。

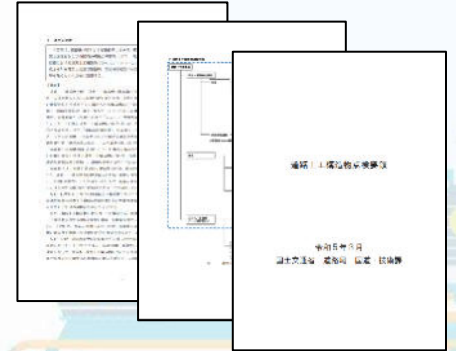
**1月20日からの大雪** **12月17日からの大雪** **西川流域被害が甚大となる暴風** (令和4年9月・令和5年5月) **令和4年7月14日からの大雨**

大雨による列車立ち往生 (山形県米沢市) 西川流域の豪雪 (西沢町・相模町) (一) 西沢町 (二) 相模町 (三) 西沢町 (四) 相模町

**台風第14号経路** **令和4年7月14日からの大雨** **台風第15号**

飯沼の噴火 (東京都葛飾区) 志の川水害大規模 (内水11区による浸水が甚大 (千葉県鎌倉市)) 土石流等による被害 (新潟県上野市) 西上川水害及び上川の水害 (山形県大石町)

**【凡例】**  
 ● 浸水箇所 (注)被災村域  
 ● 土石流箇所 (注)被災村域  
 ● 地震 (震度)  
 ▲ 噴火





## Key points: for a more resilient road network

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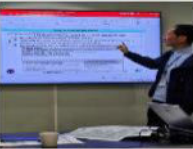

# Technical Cooperation Project in the Philippines

## TCP: Project for Road Disaster Preventions and Other Countermeasures on Mountainous Roads in the Republic of the Philippines



**SEMINAR AND ON-SITE TRAINING IN REGION XI**

**Activity 2-3: Conduct seminars and site trainings on emergency survey/ inspection/ measures on slope disaster**

**In-room**

**On-site**

Seminars for CWG and DEO members in charge of Output 2 were held in-room and on-site.

- How to fill the Disaster Record Sheet properly in the in-room seminar.
- Check the actual conditions at the sites
- Discuss and revise the Emergency Record Sheet for better use for the CWG members and others.

**PROGRESS (FROM SEP.2023 TO JAN. 2024)**

**Activity 3-2: Evaluate the hazard category**

On-site trainings for CWG and DEO members in charge of Output 3 were carried out.

**RO CAR**




**RO VII**




**RO XI**




- Selection of evaluation segments taking hazard mapping into account.
- Hazard ranking based on the evaluation sheet.

MGB (Mines and Geoscience Bureau) was invited to the onsite trainings in RO CAR and XI.

**EMERGENCY RESPONSE IN REGION XI**

**ON-GOING PHOTOS:**



7°38'36"N, 125°28'9"E accuracy: 42ft

Piling of 25 kg Sand bags

Embankment of Material for the Restoration of Shoulder

7°38'37"N, 125°28'8"E accuracy: 42ft

Compaction in every 150mm of embankment height

8:45 am

**TRAINING IN JAPAN**

**Training Overview**



**PURPOSE OF THE TRAINING:**

- To understand the technologies/countermeasures required and applicable in the Philippines based on the road disaster risk reduction and management and the road disaster information system in Japan.
- To grasp the technology and significance of countermeasure works, emergency response, hazard maps on roads, and road disaster information systems to be transferred in the project.
- To create an Action Plan for DPWH headquarters and each Regional Office.

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**THANK YOU!**

