NARLabs 國家實驗研究院
國家地震工程研究中心
NCREE National Center for Research on Earthquake Engineering

Summary Report of Hualien Earthquake in Taiwan on April 3, 2024 (first edition, v1.0)

Chung-Che Chou, Chiun-Lin Wu, Juin-Fu Chai, George C. Yao

NCREE, Taiwan

April 05, 2024

NARLabs

Members of the Emergency Response Team

Chairperson: Chung-Che Chou

Emergency Response Operation Manager (Deputy Chairperson): Chiun-Lin Wu

Deputy Emergency Response Operation Manager: Juin-Fu Chai

Executive Secretary: Chi-Hao Lin

Disaster Summary： Bo-Han Lee

Disaster Information Collection

Chun-Chung Chen, Chih-Shian Chen, Hsiao-Hui Hung, Jyun-Yan Huang, Yu-Wen Chang, Shih-Liang Chen, Che-Min Lin, Chin-Hsun Yeh, Shu-Hsien Chao, Zheng-Kuan Lee, Chia-Chuan Hsu, Jui-Liang Lin, Tsung-Chih Chiou, Min-Lang Lin, Yuan-Tao Weng, Te-Kuang Chow, Hsuan-Chih Yang, Che-Yu Chang, Shang-Yi Hsu, Fan-Ru Lin, Tzu-Chieh Chien, Zhen-Yu Lin, Wei-Hung Hsu, Wei-Chung Chen, Bai-Yi Huang, Ching-Hsien Huang, Chung-Han Yu, Chieh-Min Ho, Lee-Hui Huang

Outline

- Seismic Source and Ground Motion Characteristics
- Early Seismic Loss Estimation
- NCREE EEWS Performance
- Bridge Damage
- Building Damage
- Geotechnical Damage
- Non-Structural Component (NSC) Damage

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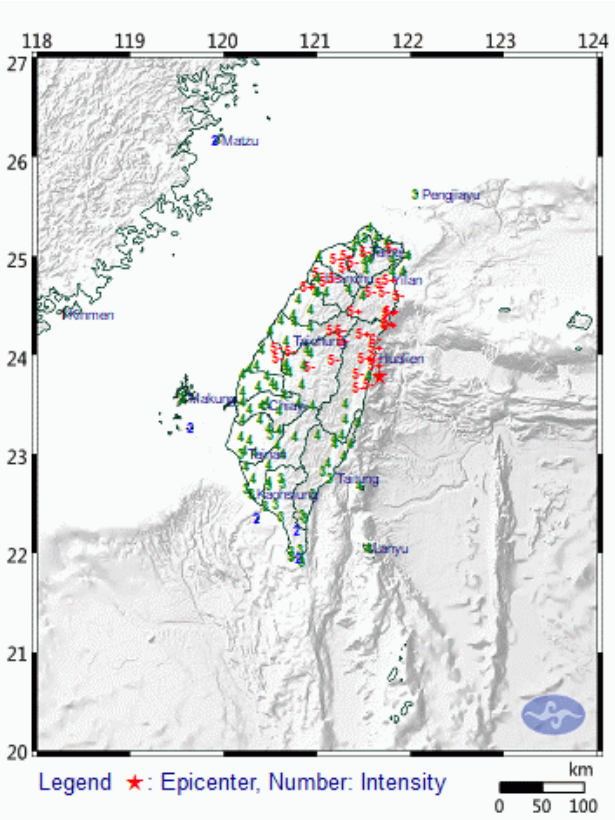
The 3rd Apr. 2024, Hualien, Taiwan earthquake

- A local magnitude M_L 7.2 earthquake occurred at 7:58:09 on 3rd Apr. 2024 local time (UTC+8). The epicenter was located offshore Hualien (25 km from the government building of Hualien County at SSE direction). The intensity was reported as 6+ in Heping, 6- in Hualien City and Taroko, and 5- in Taipei and New Taipei city.
- The epicenter was located at N 23.77˚, E 121.67˚, and the focal depth was 15.5km.



CWA EARTHQUAKE REPORT

Earthquake No.: 113019
Origin time (Taiwan Standard Time: GMT+8):
4/ 3/2024 7:58: 9.9
Epicenter: 23.77°N, 121.67°E,
i.e. 25.0 km SSE of Hualien County Hall
Focal depth: 15.5 km
Magnitude (ML): 7.2

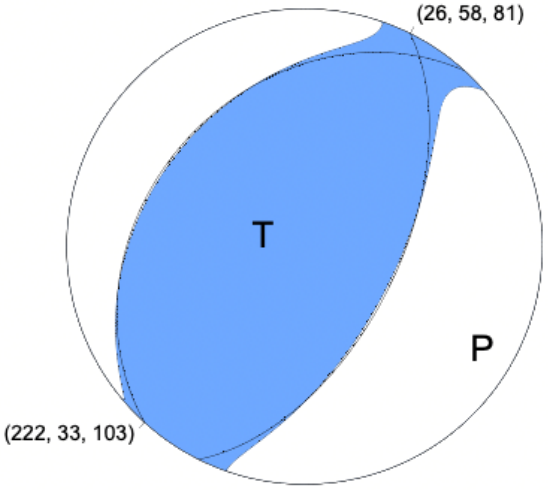
Local Largest Intensity:

Hualien County	6+	Hsinchu City	4
Yilan County	5+	Tainan City	4
Miaoli County	5+	Keelung City	4
Taichung City	5-	Pingtung County	4
Changhua County	5-	Penghu County	3
Hsinchu County	5-	Lienchiang County	2
Nantou County	5-	Kinmen County	1
Taoyuan City	5-		
New Taipei City	5-		
Taipei City	5-		
Taitung County	4		
Chiayi County	4		
Yunlin County	4		
Kaohsiung City	4		
Chiayi City	4		

From Central Weather Administration

Focal Mechanism

- The USGS's W-phase and Centroid Moment Tensor announcement indicated reverse faulting, in which the resolved moment magnitude (Mw) was 7.37 and the focal depth was 23.5 km. The IRIS, GCMT, and AutoBATS did not provide the focal mechanism till 15:30 local time on 3rd Apr.
- The Global Real-Time Moment Tensor Monitoring System by IES resolved a similar focal mechanism with the USGS. The resulting Mw was 7.66, and the focal depth was 35.5 km.

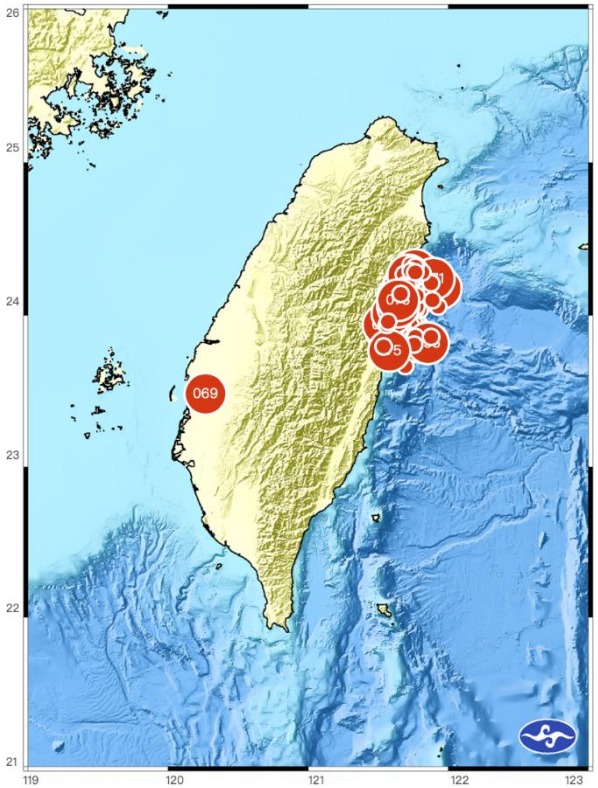


(USGS)

(GRMT, IES)

Aftershock Activities

- The Central Weather Administration (CWA) announced 57 aftershocks until 15:30 on 3rd Apr., including an M_L 6.5 event that the highest intensity of this event was 5+.

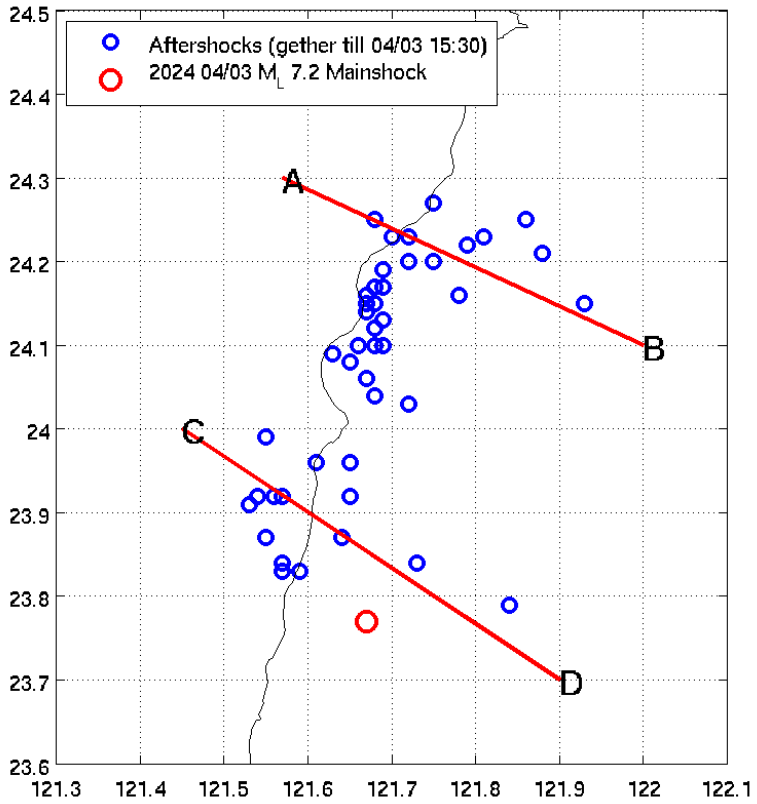


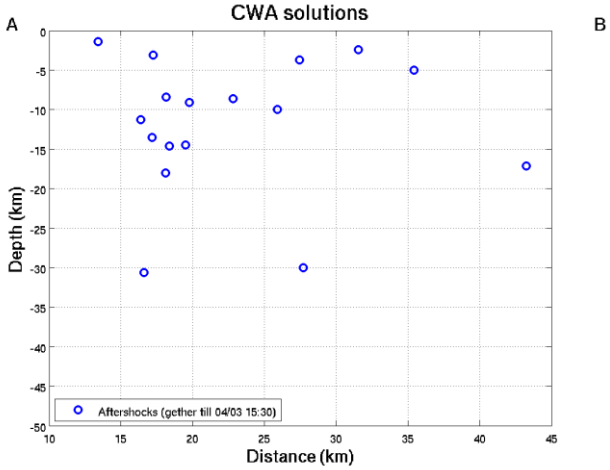
From Central Weather Administration

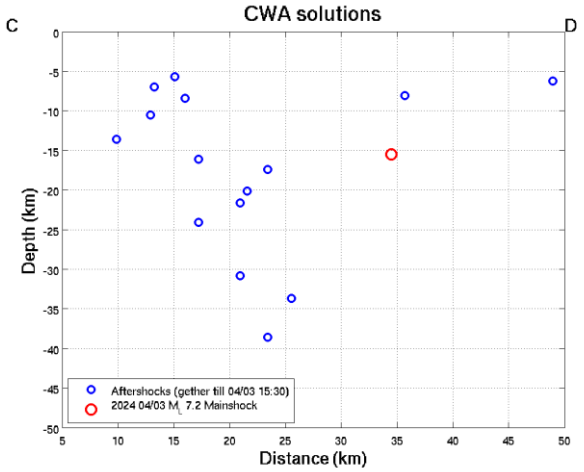
編號	最大震度	詳細資訊
026	4級	04/03 08:35 NEW 看更多 地點: 花蓮縣政府北北東方28.4公里 (位於花蓮縣近海) 深度: 14.6km 地震規模: 5.6
025	4級	04/03 08:30 NEW 看更多 地點: 花蓮縣政府東北方37.6公里 (位於臺灣東部海域) 深度: 2.4km 地震規模: 4.6
024	3級	04/03 08:27 NEW 看更多 地點: 花蓮縣政府南南西方19.0公里 (位於花蓮縣壽豐鄉) 深度: 20.1km 地震規模: 4.9
023	3級	04/03 08:23 NEW 看更多 地點: 花蓮縣政府東南方4.3公里 (位於花蓮縣近海) 深度: 30.8km 地震規模: 4.4
022	4級	04/03 08:17 NEW 看更多 地點: 花蓮縣政府東北東方11.4公里 (位於花蓮縣近海) 深度: 32.2km 地震規模: 5.4
021	5強	04/03 08:11 NEW 看更多 地點: 花蓮縣政府北北東方12.7公里 (位於花蓮縣近海)

Distribution of Aftershock

- The profile of the aftershock distribution maps until 15:30 on 3rd Apr. is shown as follows:

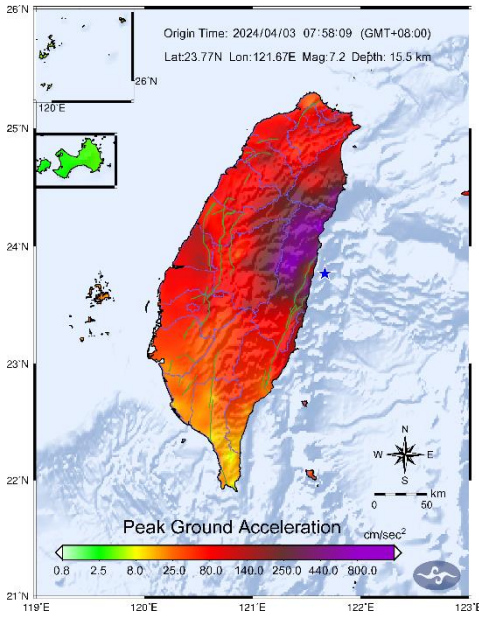


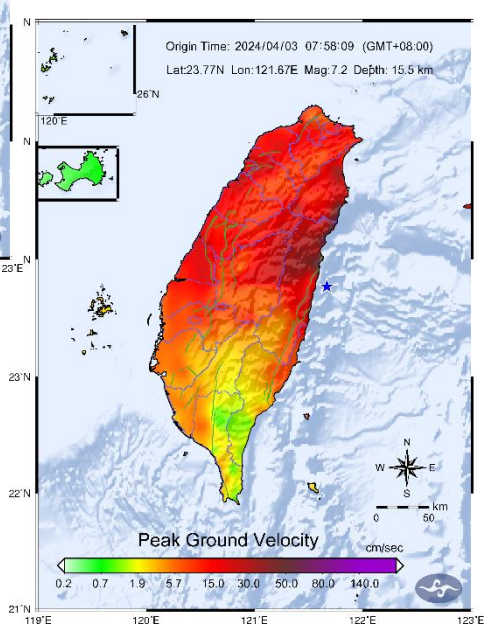




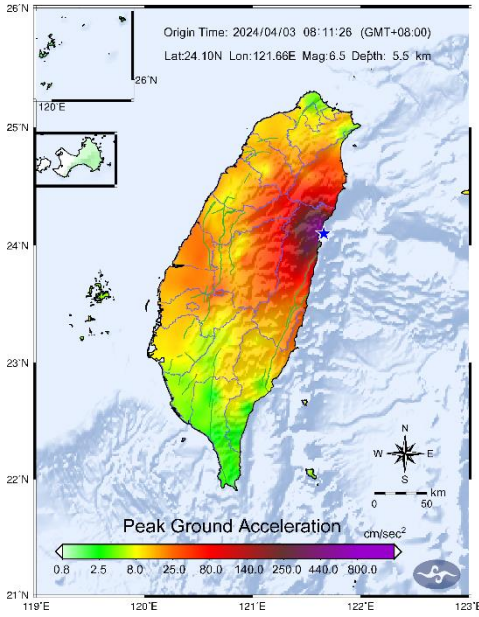
PGA and PGV Map by CWA

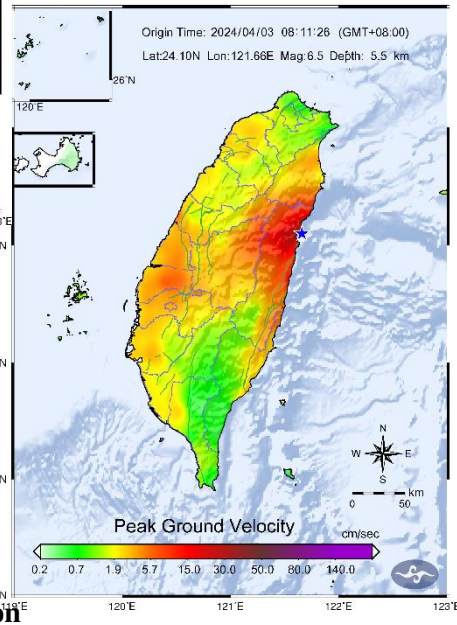
Main shock
0403 M_L7.2, Depth 15.5km





Largest aftershock
0403 M_L6.5, Depth 5.5km

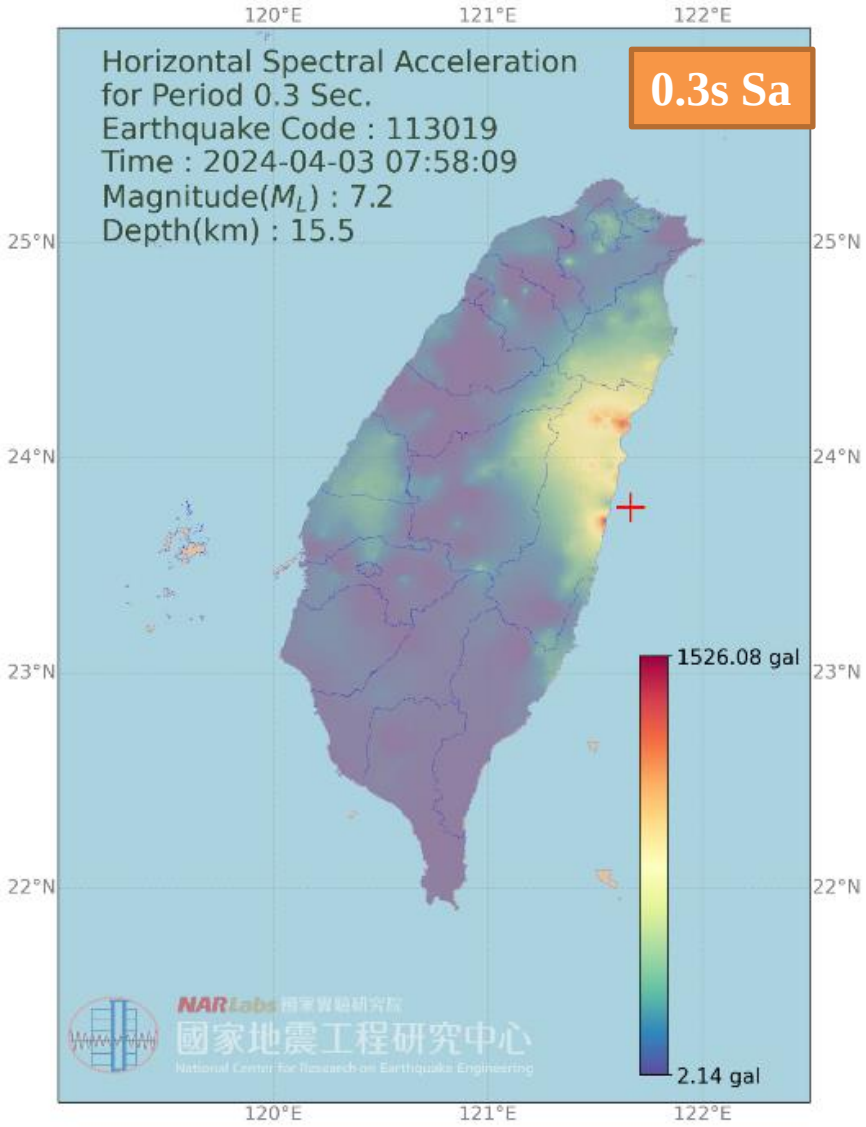


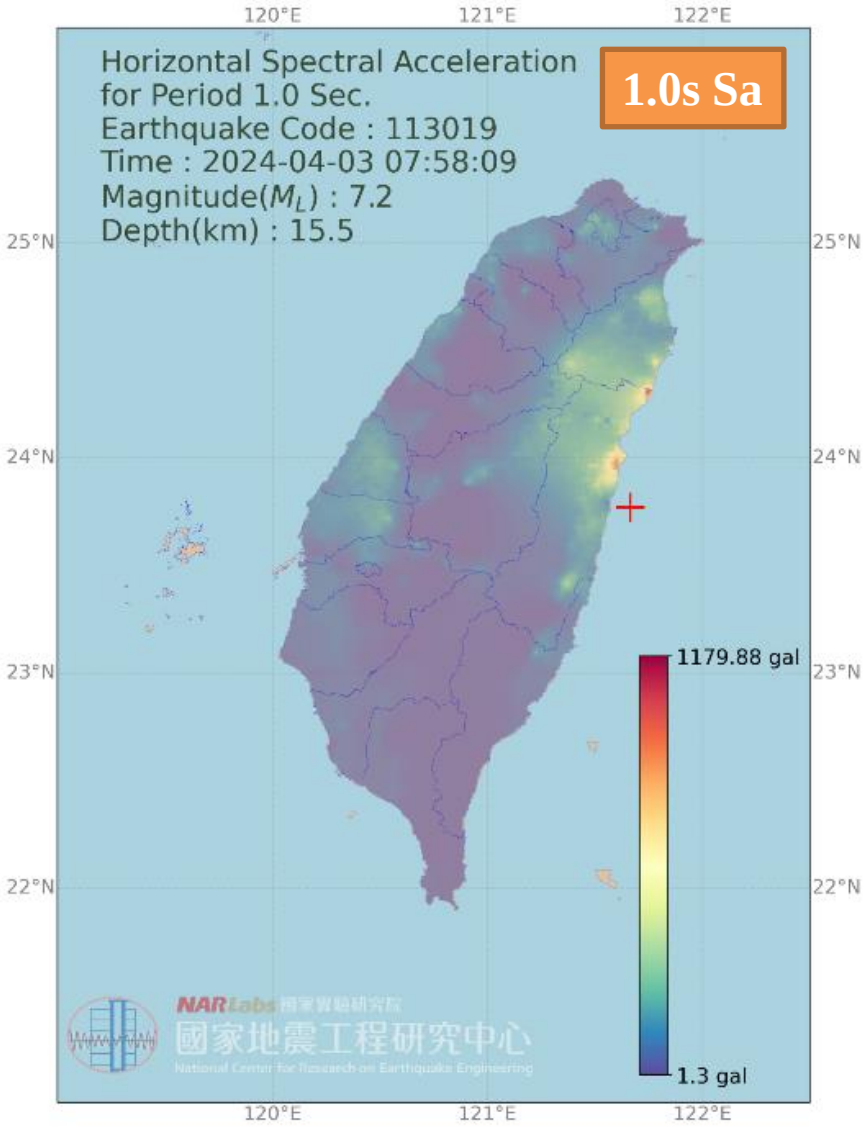


From Central Weather Administration

Spectral Acceleration Maps

0403 M_L7.2, Depth 15.5km





Time Histories

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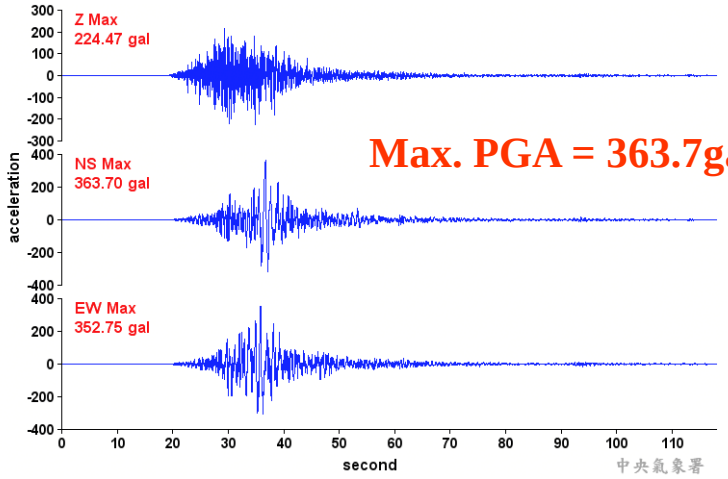
0403 M_L 7.2, Depth 15.5km

From Central Weather Administration

Heping (EHP), Int.= 6-

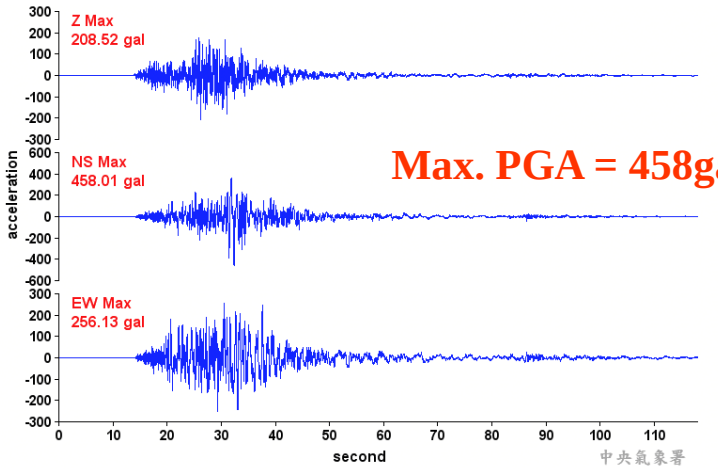
Stalon=121.75, Stalat=24.31, Dist.= 60.42km, BAZ=188.17



Max. PGA = 363.7gal

Hualien City (HWA), Int.= 6-

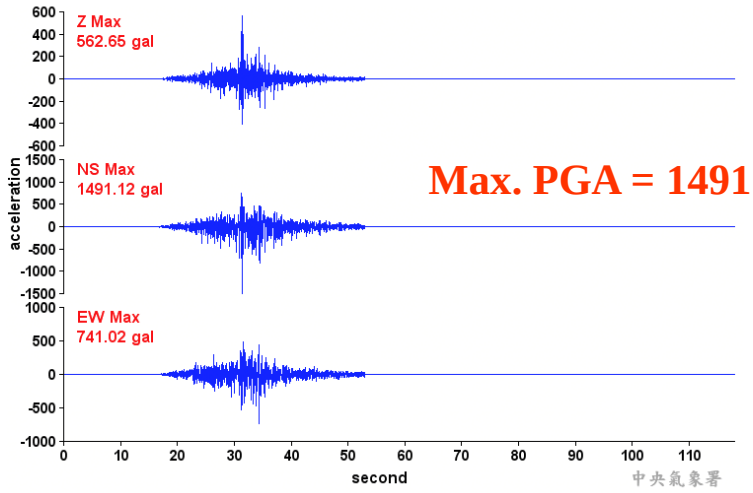
Stalon=121.61,Stalat=23.98,Dist= 23.41,BAZ=167.05



Max. PGA = 458gal

Taroko (ETL), Int.= 6-

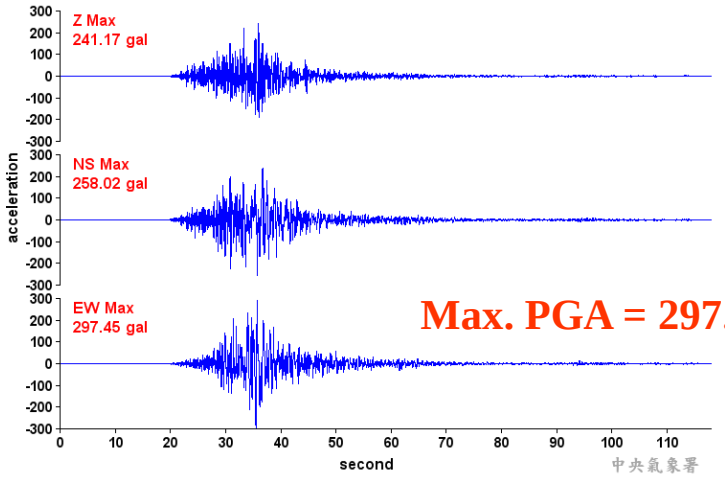
Stalon=121.62,Stalat=24.16,Dist= 43.37,BAZ=174.33



Max. PGA = 1491.1gal

Aohua (EAH), Int.= 5+

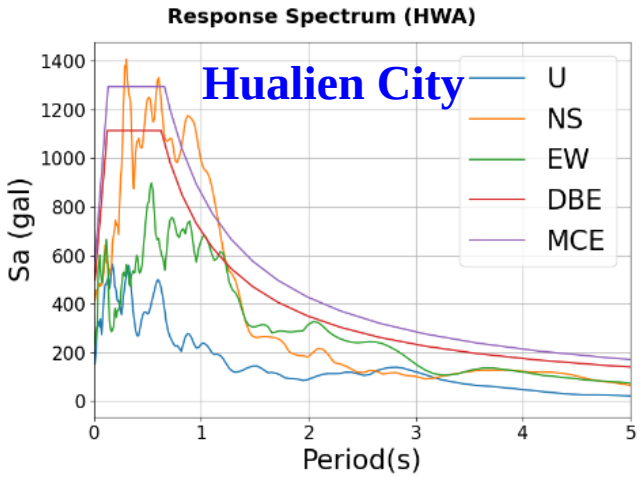
Stalon=121.74,Stalat=24.33,Dist= 62.51,BAZ=186.94

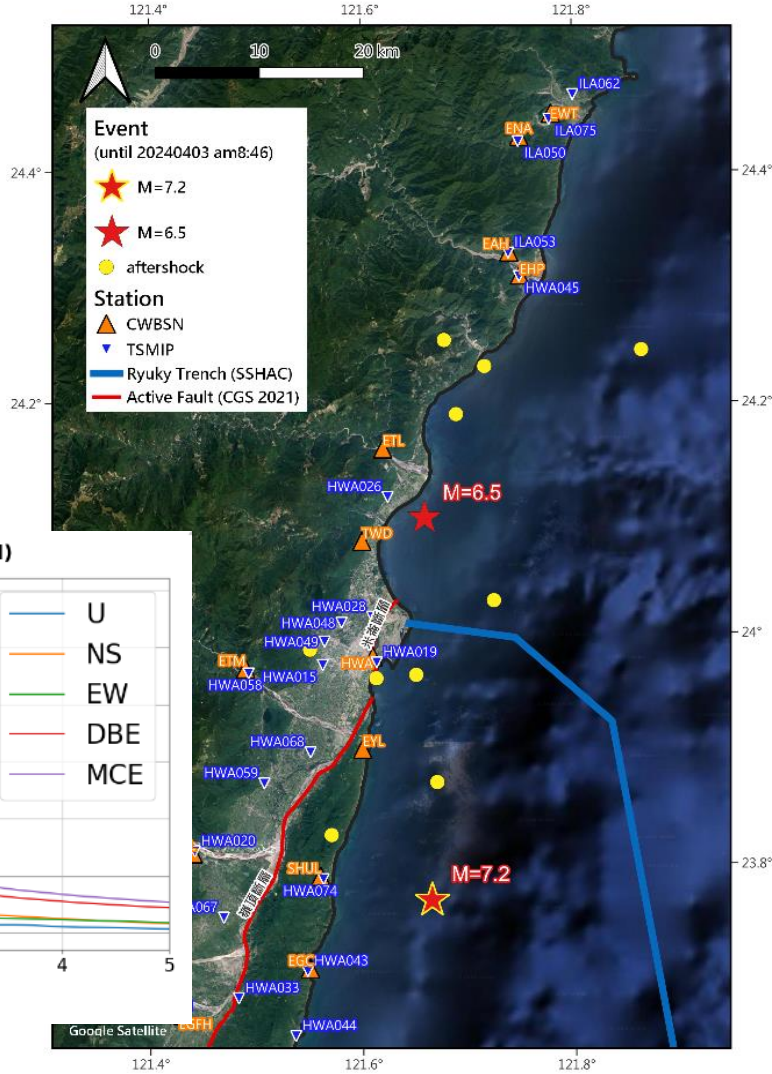


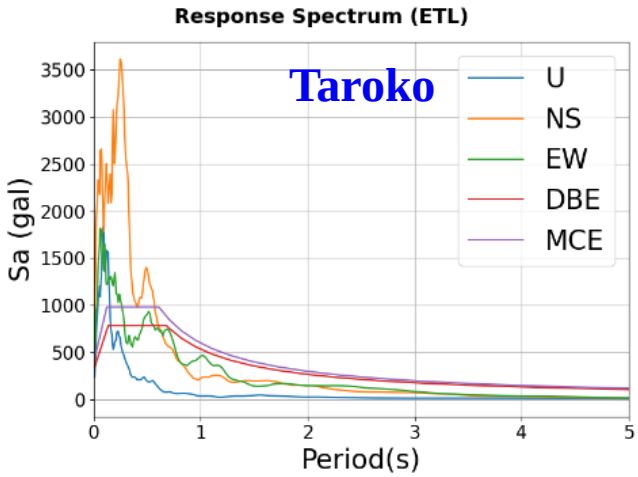
Max. PGA = 297.5gal

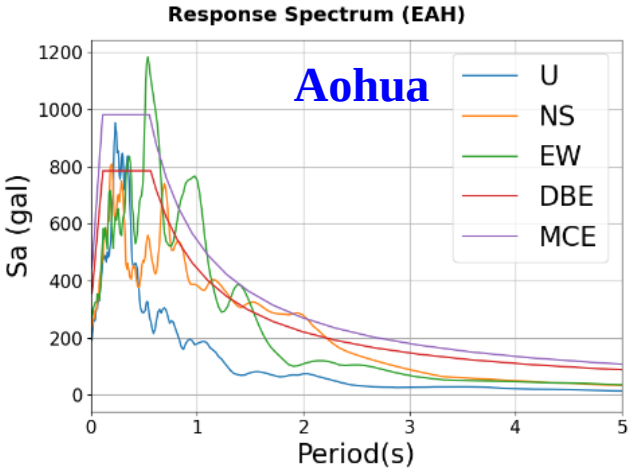
Observed Data and Design Spectra

0403 M_L7.2, Depth 15.5km









DBE and MCE for Horizontal

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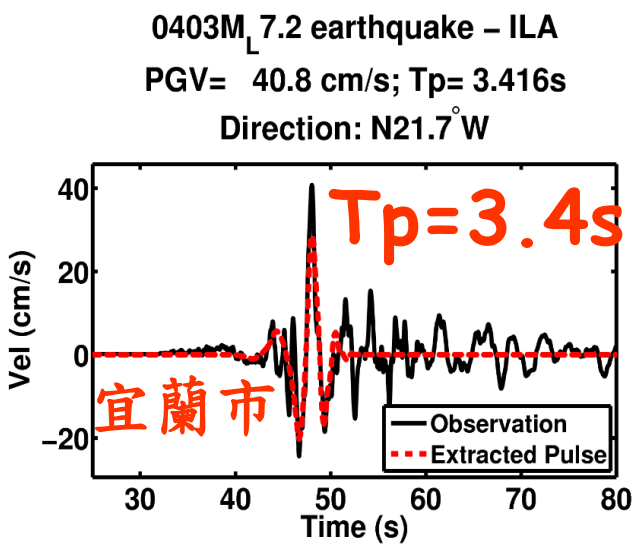
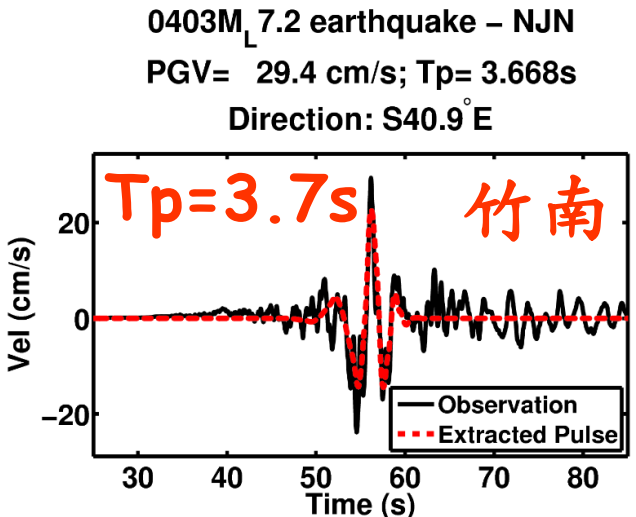
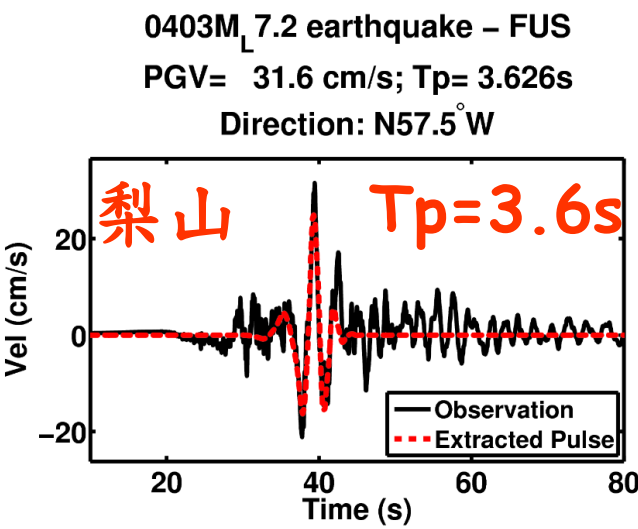
Pulse-Like Velocity Time Histories

- Three stations observed the pulse-like velocity (velocity pulse) from the Taiwan Rapid Earthquake Information Release System (RTD) till 15:30 on 3rd Apr. The extracted pulses are derived from Shahi and Baker's 2014 method. The corresponding pulse periods are 3.4 to 3.7 seconds.
- The PGV observed near the source at Heping、Hualien city are 65.7cm/s and 56.3cm/s, which are larger than the three stations but no velocity pulses extracted.







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Pulse-Like Velocity Time Histories

- There were 11 additional pulse-like velocity time history observed by the TSMIP stations, listed as follows:

Station codes	Longitude	Latitude	Pulse Period(s)	PGV(cm/s)
ILA	121.76	24.76	3.4	40.8
FUS	121.24	24.25	3.6	31.6
NJN	120.87	24.68	3.7	29.4
ILA004	121.7907	24.7435	2.9	55.4
ILA006	121.8327	24.6397	3.1	50.9
ILA026	121.7728	24.6733	4.0	49.2
ILA037	121.7228	24.7435	2.5	42.5
ILA042	121.7987	24.6875	2.9	59.3
ILA046	121.7423	24.6650	3.4	27.2
ILA049	121.7563	24.7638	3.4	40.9
ILA059	121.8297	24.6655	3.4	55.5
ILA068	121.8573	24.5972	1.5	36.6

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Pulse-Like Velocity Time Histories

- There were 11 additional pulse-like velocity time history observed by the TSMIP stations, listed as follows:

Station codes	Longitude	Latitude	Pulse Period(s)	PGV(cm/s)
TCU033	120.8703	24.6835	3.9	33.6
TCU035	120.7970	24.6142	3.7	25.4

CWA Earthquake Report for the Largest aftershock

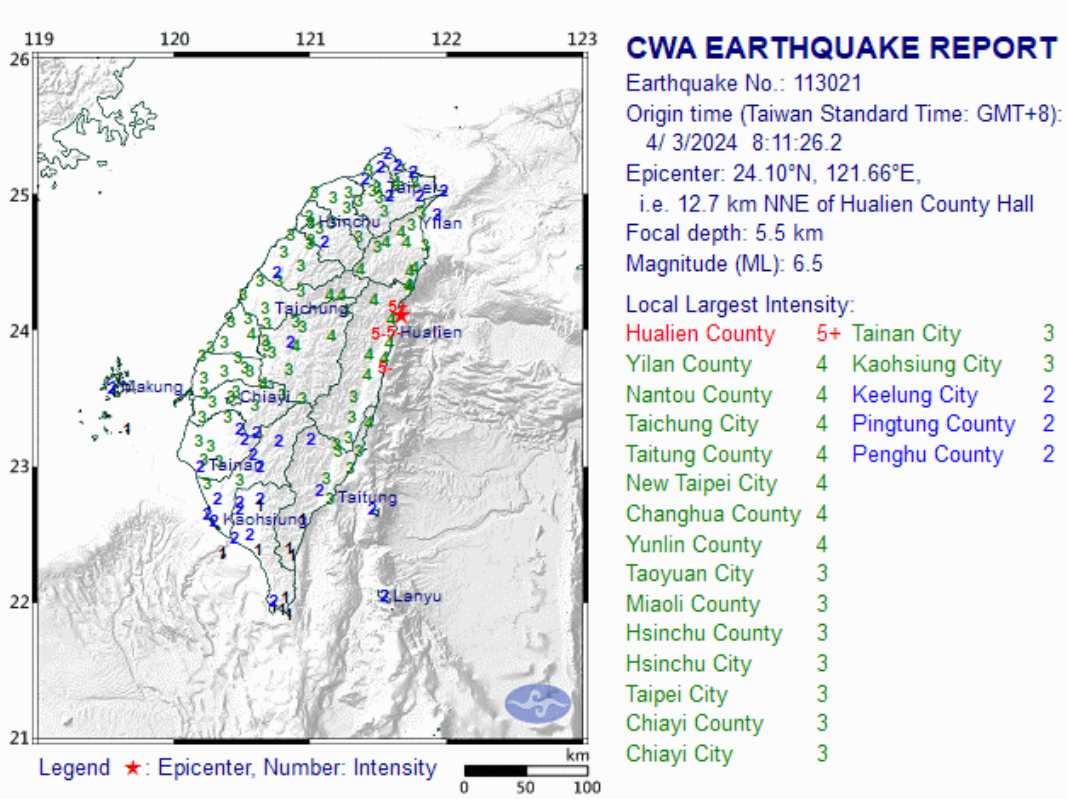
- Earthquake No.: 113021

  Origin time (Taiwan Standard Time: GMT+08:00): 4/ 3/2024 8:11:26.2

  Location: 24.10N 121.66E, i.e. 12.7 km NNE of Hualien County

  Depth : 5.5 km

  Magnitude(M_L): 6.5



From Central Weather Administration

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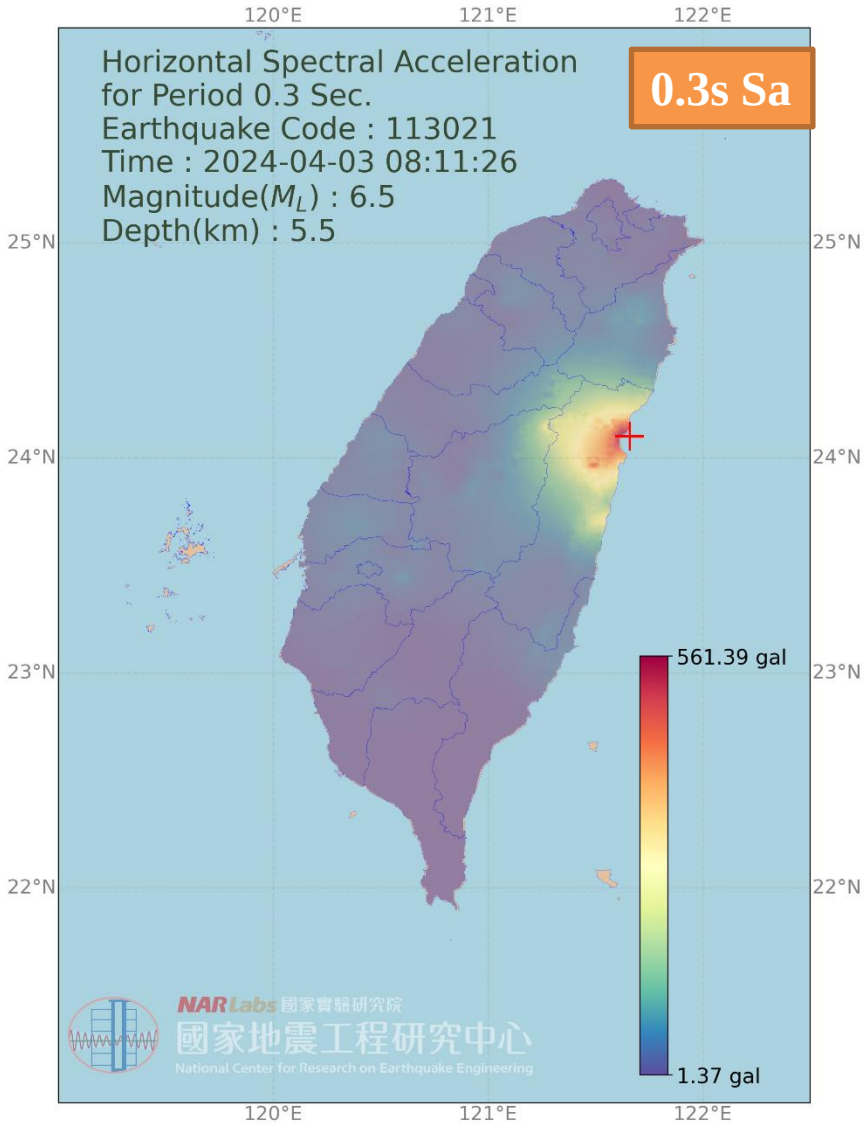
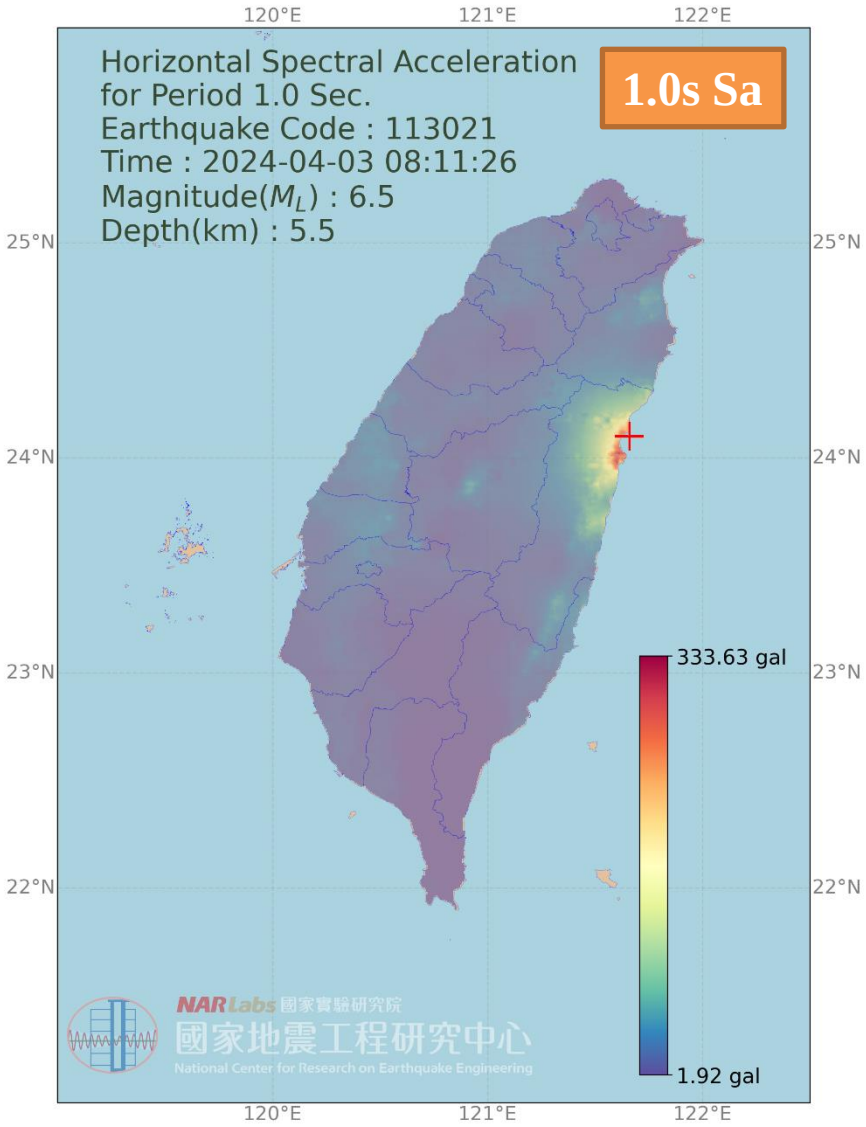
Spectral Acceleration Maps

0403 M_L6.5, Depth 5.5km





Time Histories

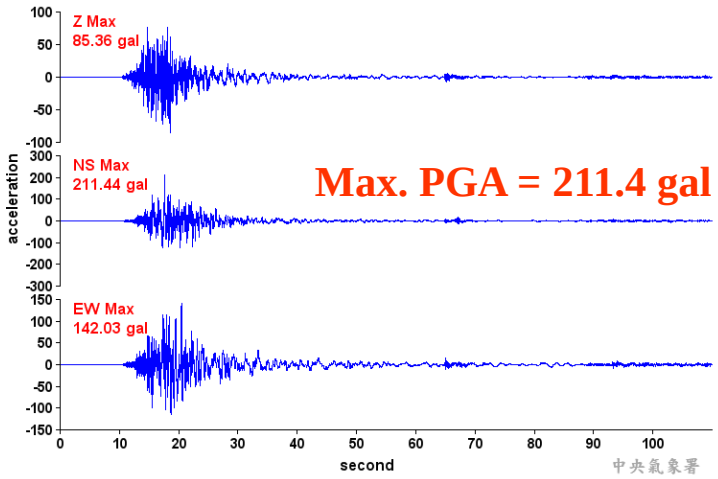
NARLabs

0403 M_L 6.5, Depth 5.5km

From Central Weather Administration

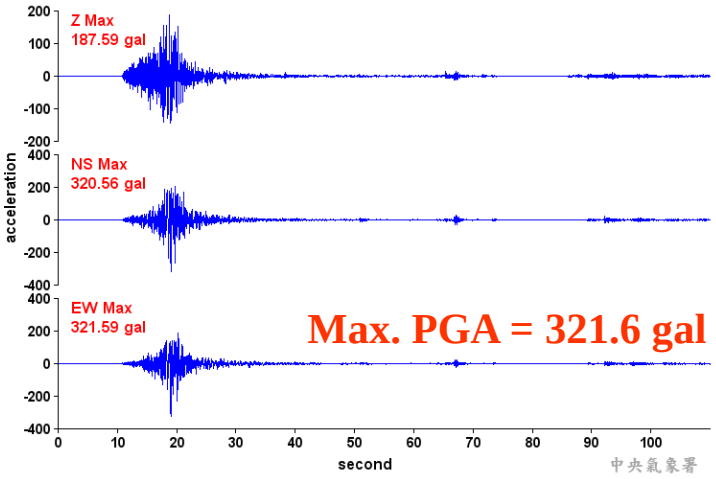
Hualien City (HWA), Int.= 5-

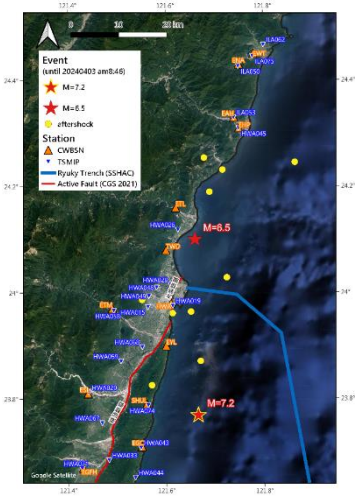
Stalon=121.61,Stalat=23.98,Dist= 14.64,BAZ= 18.50

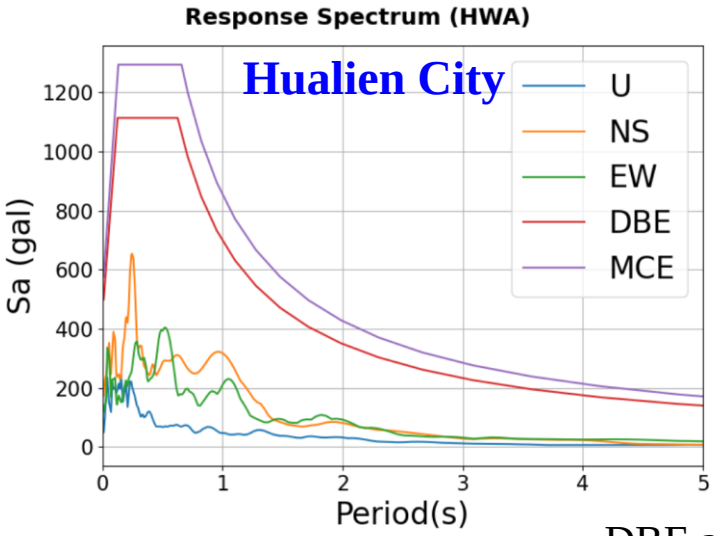


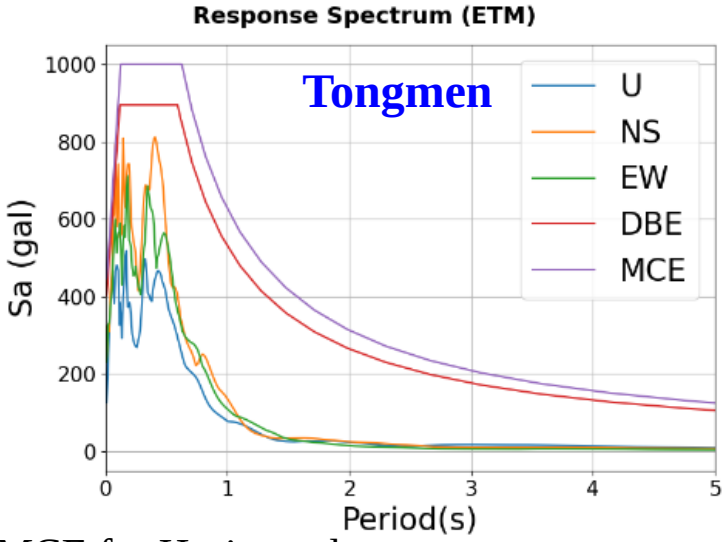
Tongmen (ETM), Int.= 5-

Stalon=121.49,Stalat=23.97,Dist= 22.54,BAZ= 48.66









DBE and MCE for Horizontal

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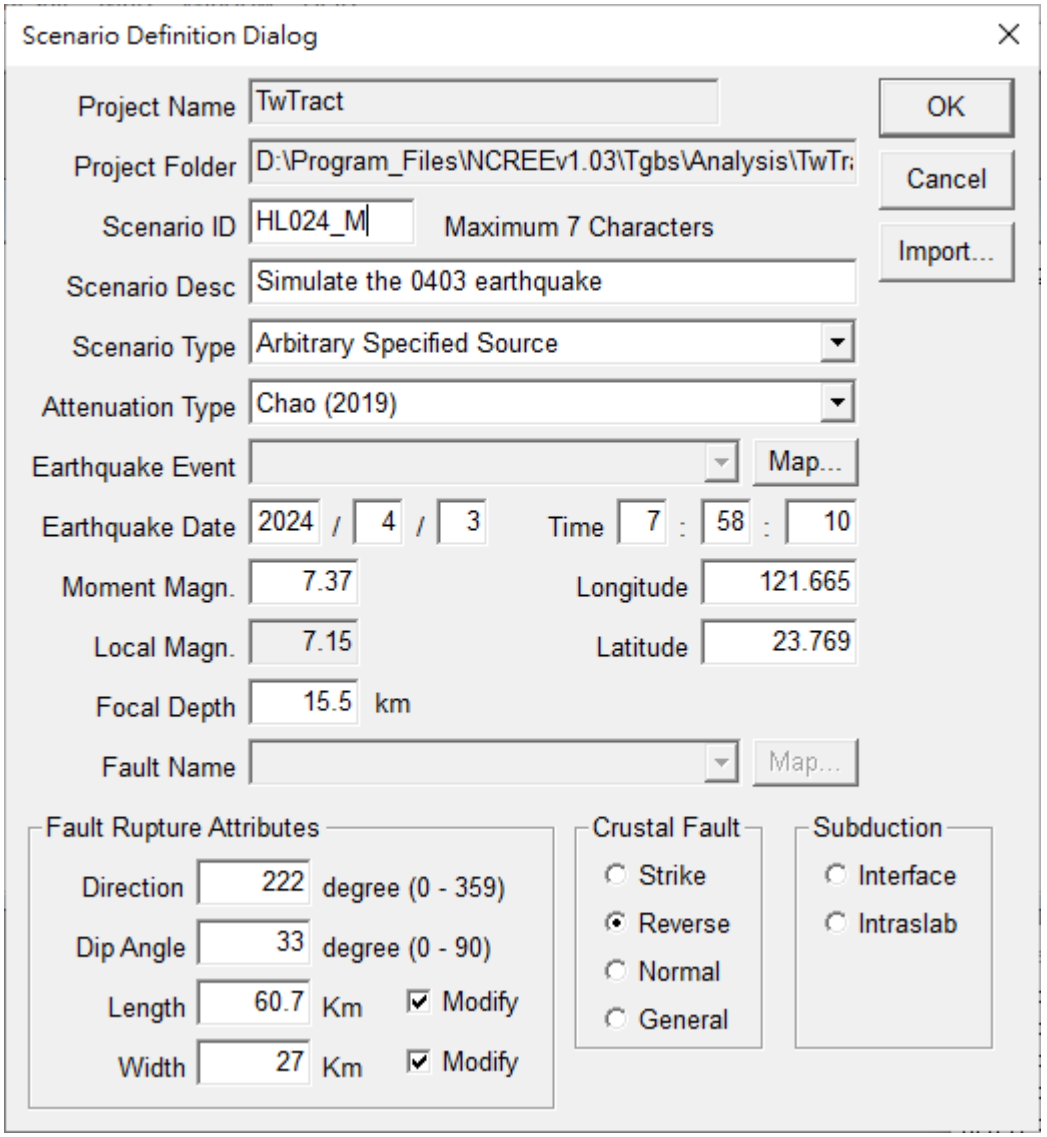
NARLabs

Seismic Source Parameters Assumed



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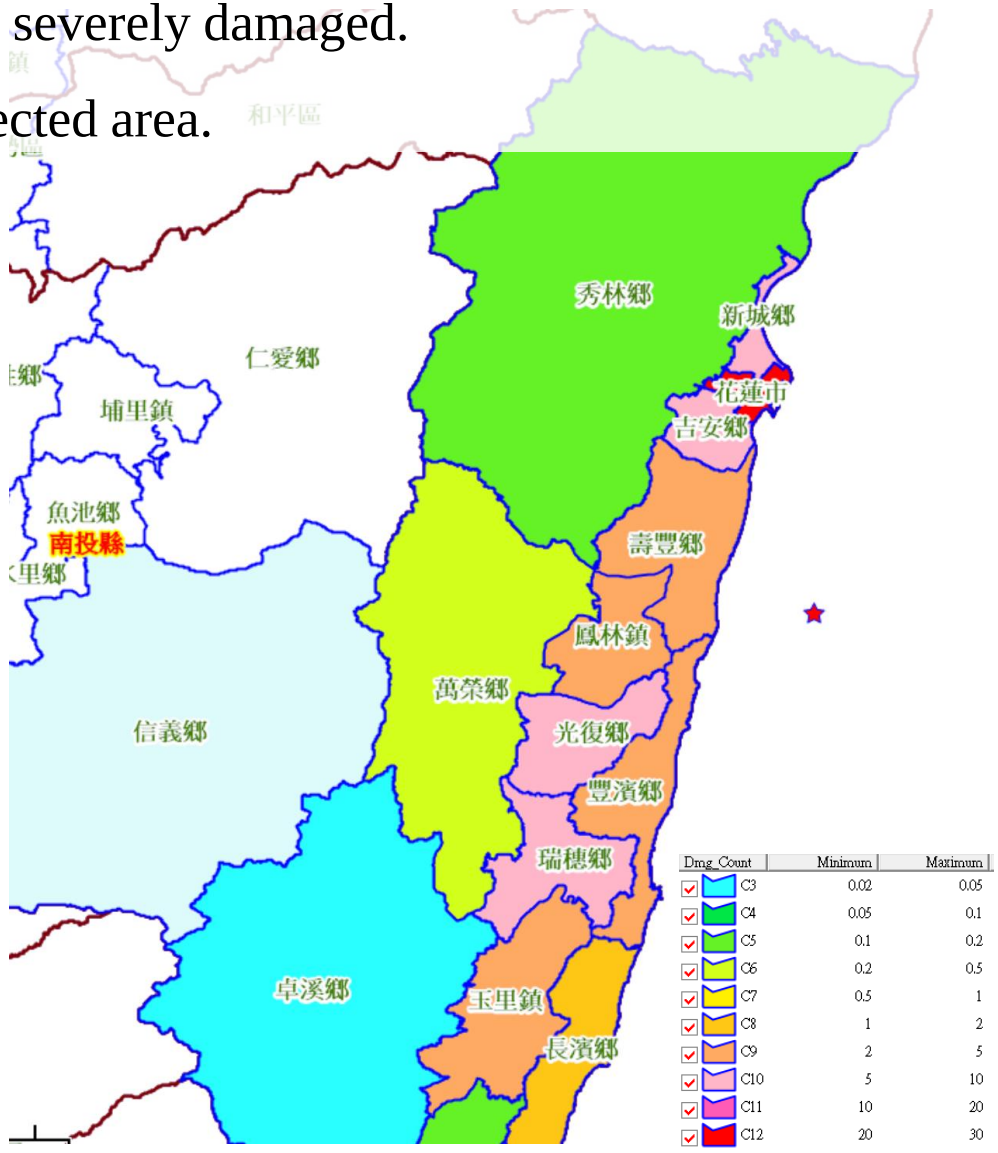
Estimation of Building Damage

- Estimated result：about 84 buildings severely damaged.
- Hualien City is the most severely affected area.

County	1-3 Floor	4-7 Floor	Over 8 Floor	Total
Hualien	52	18	1	71
Yilan	8	3	0	11
Taitung	2	0	0	2

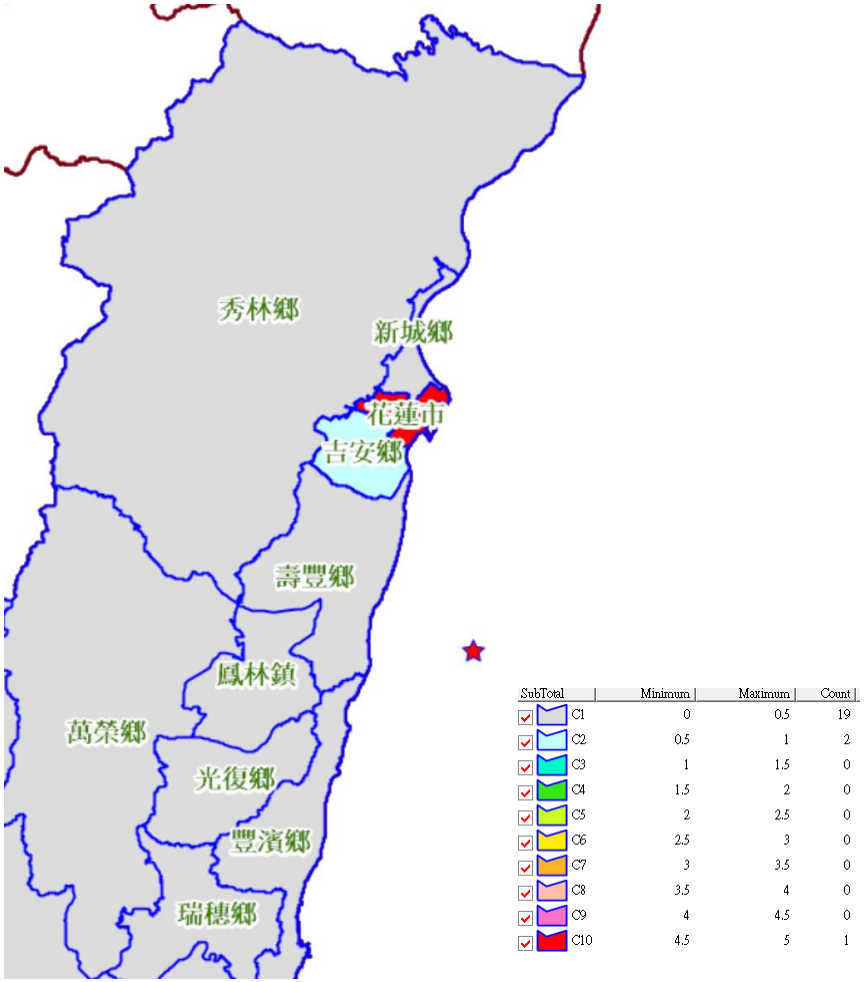
County	Township	1-3 Floor	4-7 Floor	Over 8 Floor	Total
Hualien	Hualien	17	12	1	30
Hualien	Ji'an	7	3	0	10
Yilan	Luodong	7	2	0	9
Hualien	Guangfu	6	1	0	7
Hualien	Xincheng	5	0	0	5
Hualien	Ruisui	5	0	0	2
Hualien	Fengbin	4	1	0	5
Hualien	Shoufeng	2	1	0	3
Hualien	Yuli	3	0	0	3
Hualien	Fenglin	3	0	0	3



Estimation of Casualties

- Estimated result：about 8 people severely injured or killed
- Hualien City is the most severely affected area.

County	Township	Casualty
Hualien	Hualien	5
Hualien	Luodong	2
Hualien	Ji'an	1



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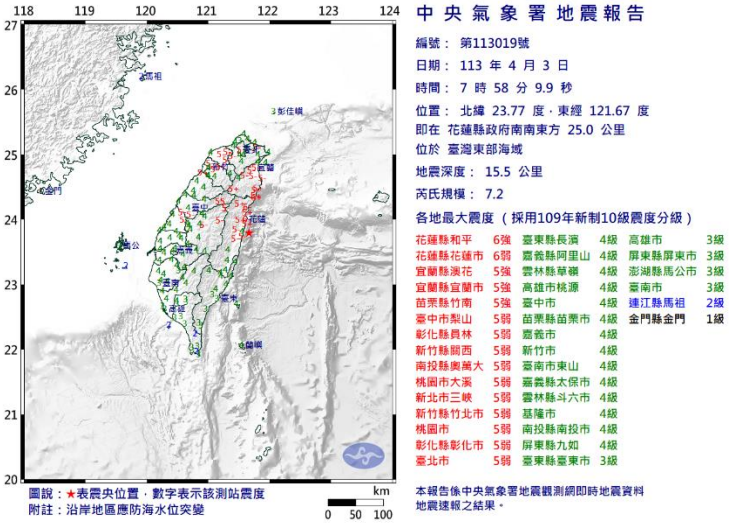
CWA No.113019

NARLabs

EEW Broadcast 2024/04/03 07:58:9.9

時　　間 Time	觸發主站 Source	警 報 提 供 新 增 鄉 鎮 市 區 EEW for Townships	來源(影響數量) Source (Number)
07:58:21.173	富源國小 NCREE On-site	花蓮縣3區(光復鄉,豐濱鄉,瑞穗鄉)	N(3)
07:58:28.084	CWA	花蓮縣10區、臺東縣11區、宜蘭縣11區、基隆市4區、臺北市12區、新北市25區、桃園市13區、新竹市3區、新竹縣13區、苗栗縣18區、南投縣13區、臺中市29區、彰化縣26區、雲林縣20區、嘉義縣18區、嘉義市2區、臺南市31區、高雄市3區(茂林區,桃源區,那瑪夏區) 、屏東縣2區(三地門鄉,霧臺鄉)、澎湖縣3區	N(3) C(267)



中 央 氣 象 署 地 震 報 告

編號： 第113019號
日期： 113 年 4 月 3 日
時間： 7 時 58 分 9.9 秒
位置： 北緯 23.77 度，東經 121.67 度
即在 花蓮縣政府南南東方 25.0 公里
位於 臺灣東部海域
地震深度： 15.5 公里
芮氏規模： 7.2
各地最大震度（採用109年新制10級震度分級）

花蓮縣和平	6強	臺東縣長濱	4級	高雄市	3級
花蓮縣花蓮市	6弱	嘉義縣阿里山	4級	屏東縣屏東市	3級
宜蘭縣溪花	5強	雲林縣草嶺	4級	澎湖縣馬公市	3級
宜蘭縣宜蘭市	5強	高雄市桃源	4級	臺南市	3級
苗栗縣竹南	5強	臺中市	4級	連江縣馬祖	2級
臺中市梨山	5弱	苗栗縣苗栗市	4級	金門縣金門	1級
彰化縣員林	5弱	嘉義市	4級		
新竹縣關西	5弱	新竹市	4級		
南投縣奧萬大	5弱	臺南市東山	4級		
桃園市大溪	5弱	嘉義縣太保市	4級		
新北市三峽	5弱	雲林縣斗六市	4級		
新竹縣竹北市	5弱	基隆市	4級		
桃園市	5弱	南投縣南投市	4級		
彰化縣彰化市	5弱	屏東縣九如	4級		
臺北市	5弱	臺東縣臺東市	3級		

本報告係中央氣象署地震觀測網即時地震資料地震速報之結果。

07:58:26 中央氣象署
[地震速報 Earthquake Alert]04/03 07:58左右花蓮地區發生顯著有感地震，慎防強烈搖晃，就近避難「趴下、掩護、穩住」，氣象署。Felt earthquake alert. Keep calm and seek cover nearby. CWA

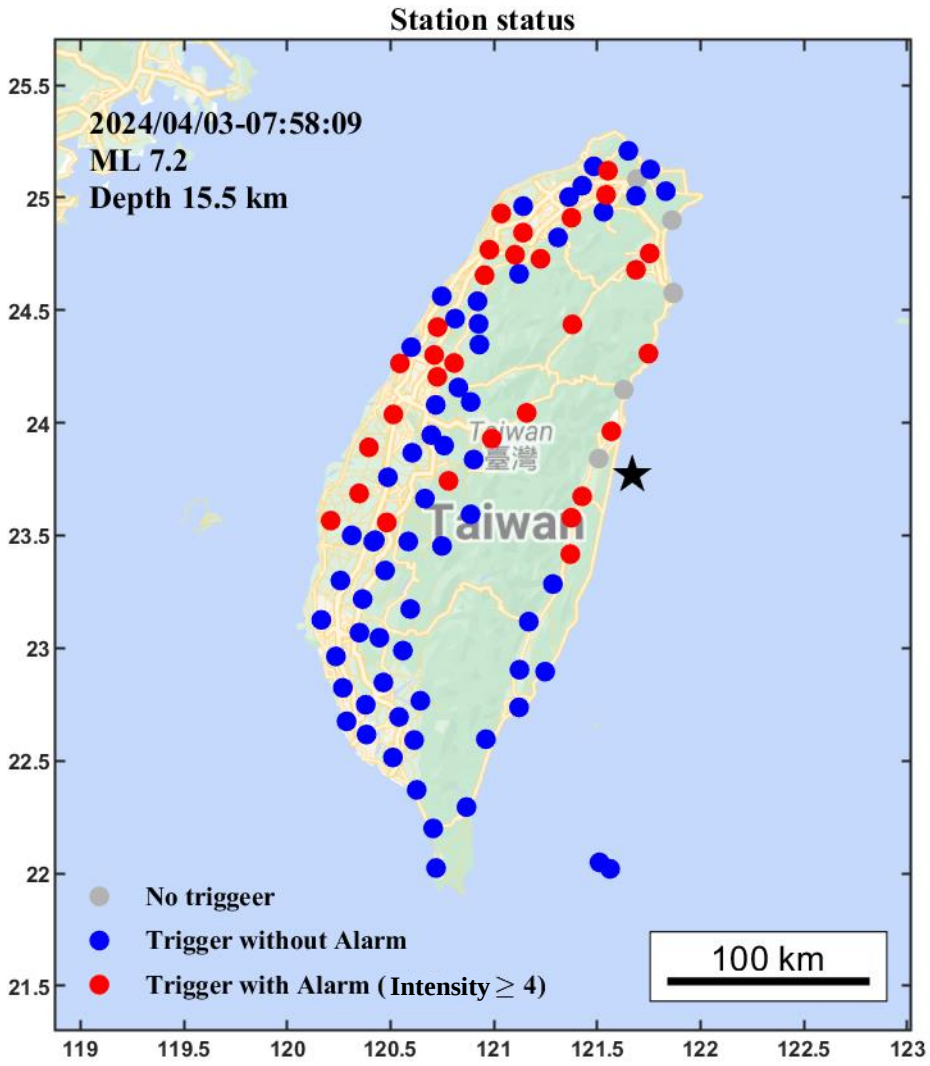
07:58:19 中央氣象署
[地震速報 Earthquake Alert]04/03 07:58左右花蓮地區發生顯著有感地震，慎防強烈搖晃，就近避難「趴下、掩護、穩住」，氣象署。Felt earthquake alert. Keep calm and seek cover nearby. CWA

PS：07:58:24 (CWA EEW sent)
07:58:28.058 (NCREE received)

07:58:9.9 → 11.273s → 07:58:21.173 → 6.911s → 07:58:28.084

EQ. Occurrence　　First NCREE On-Site EEW　　Hybrid Union EEW

NCREE On-Site EEWS Performance



CWA No.113019

2024/04/03-07:58:09 ML 7.2

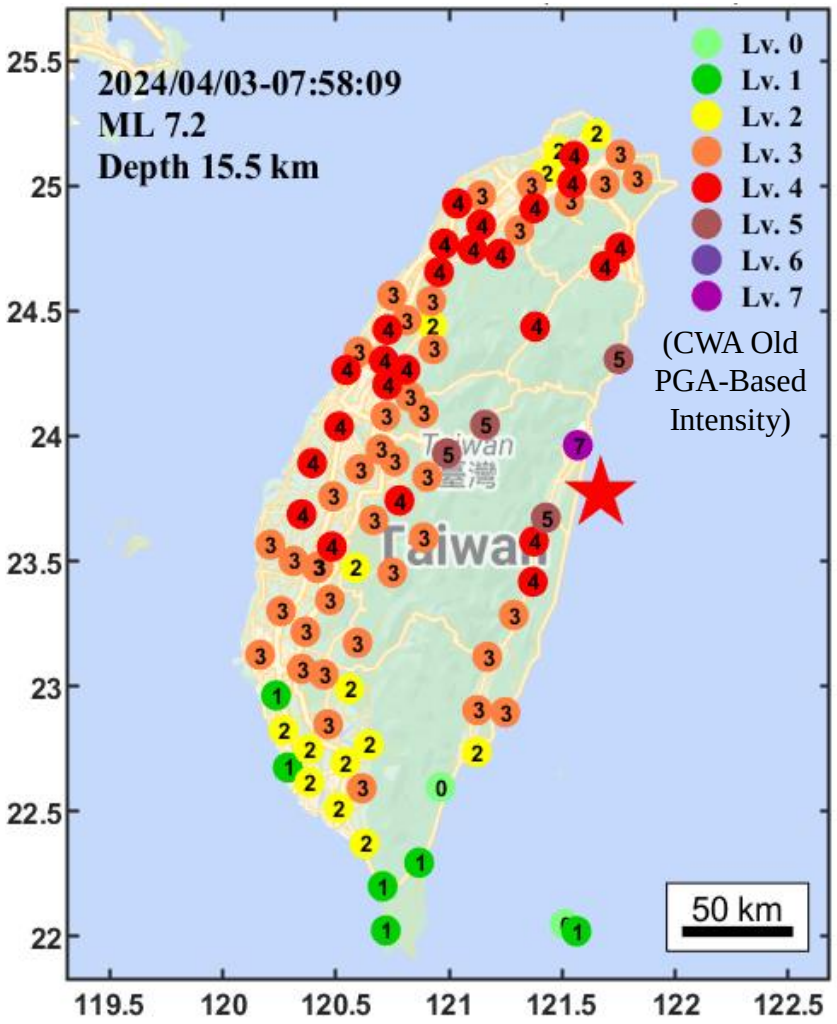
No trigger : 7 STAs

Trigger without Alarm : 62 STAs

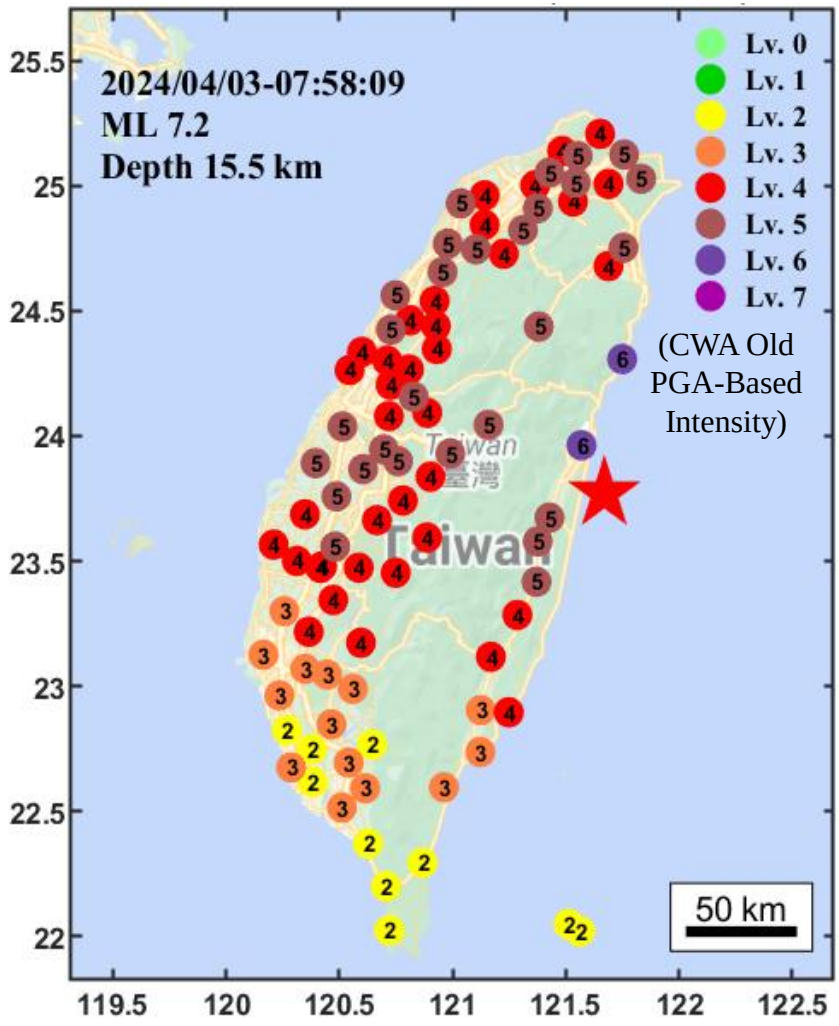
Trigger with Alarm (I>=4): 29 STAs

NCREE On-Site EEWS
Predicted and Measured Intensities

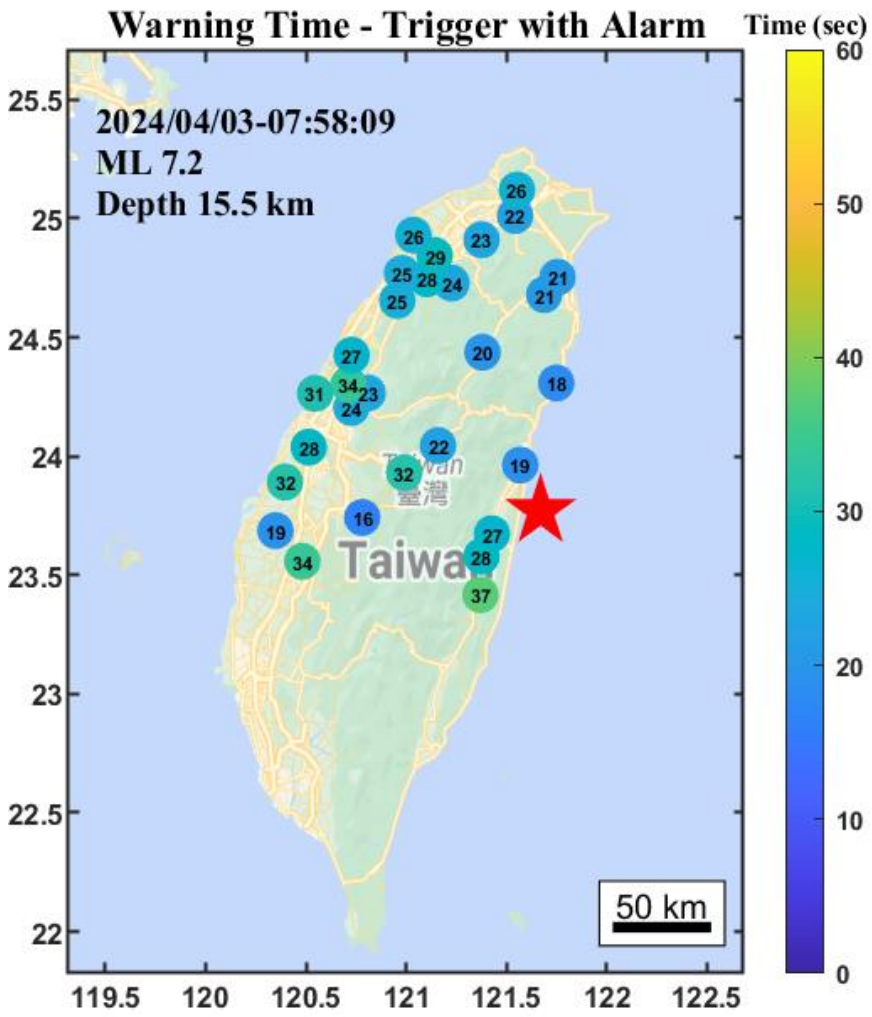
Predicted Intensities (CWA-Old)

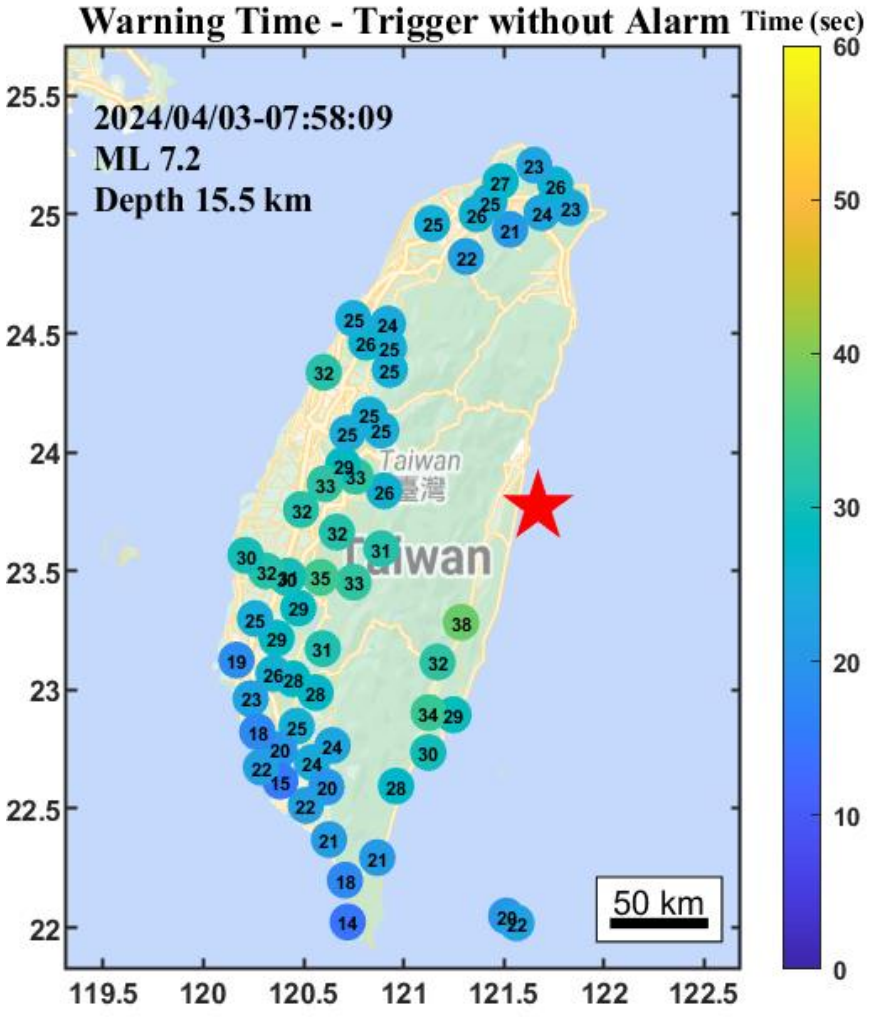


Measured Intensities (CWA-Old)

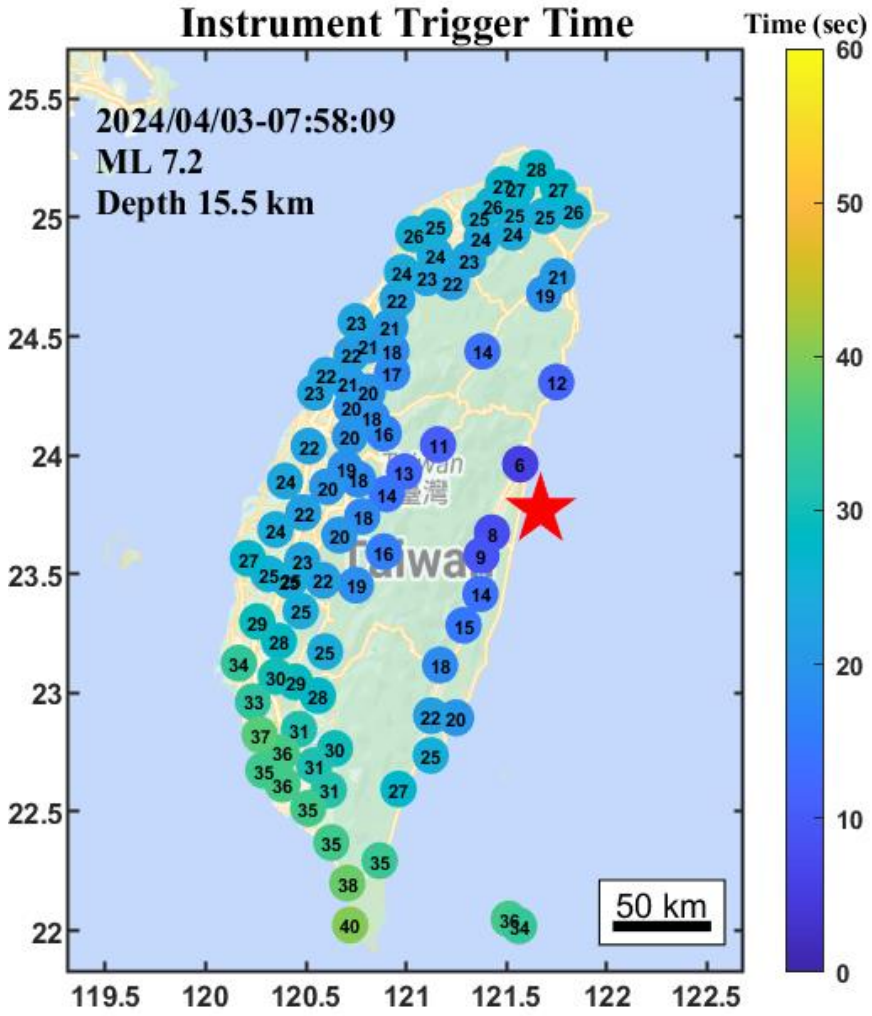


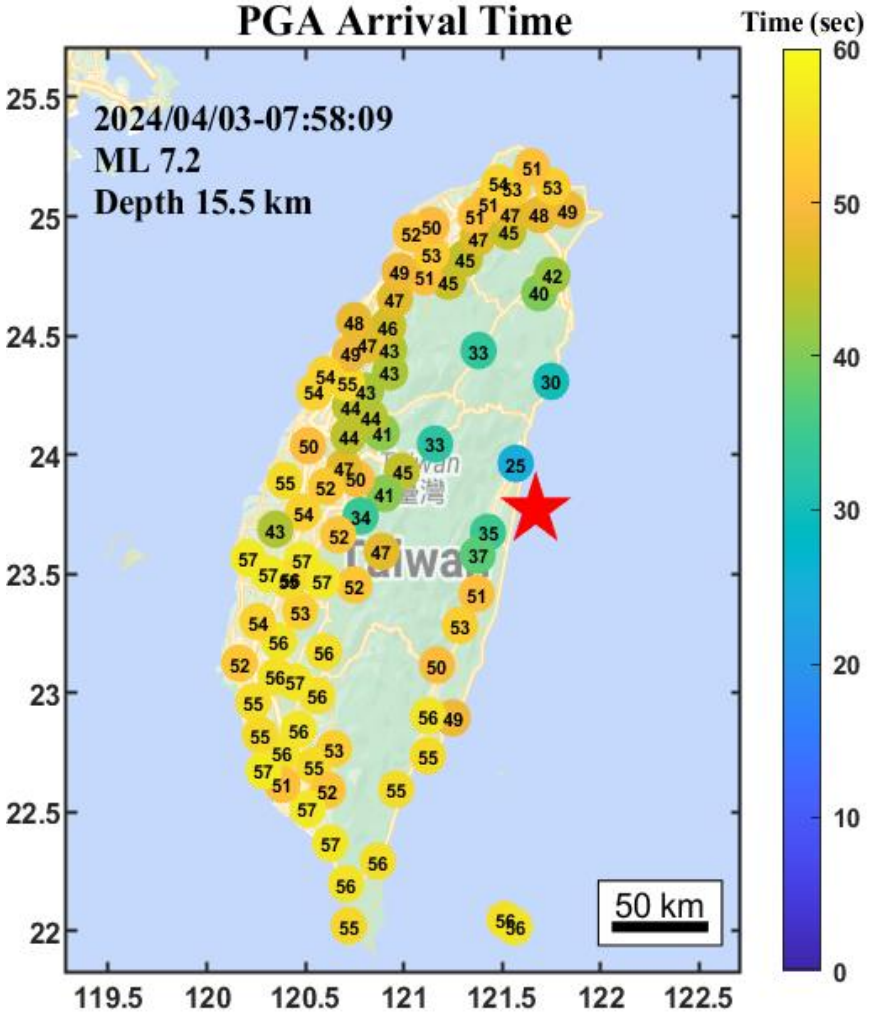
NCREE On-Site EEWS Warning Time



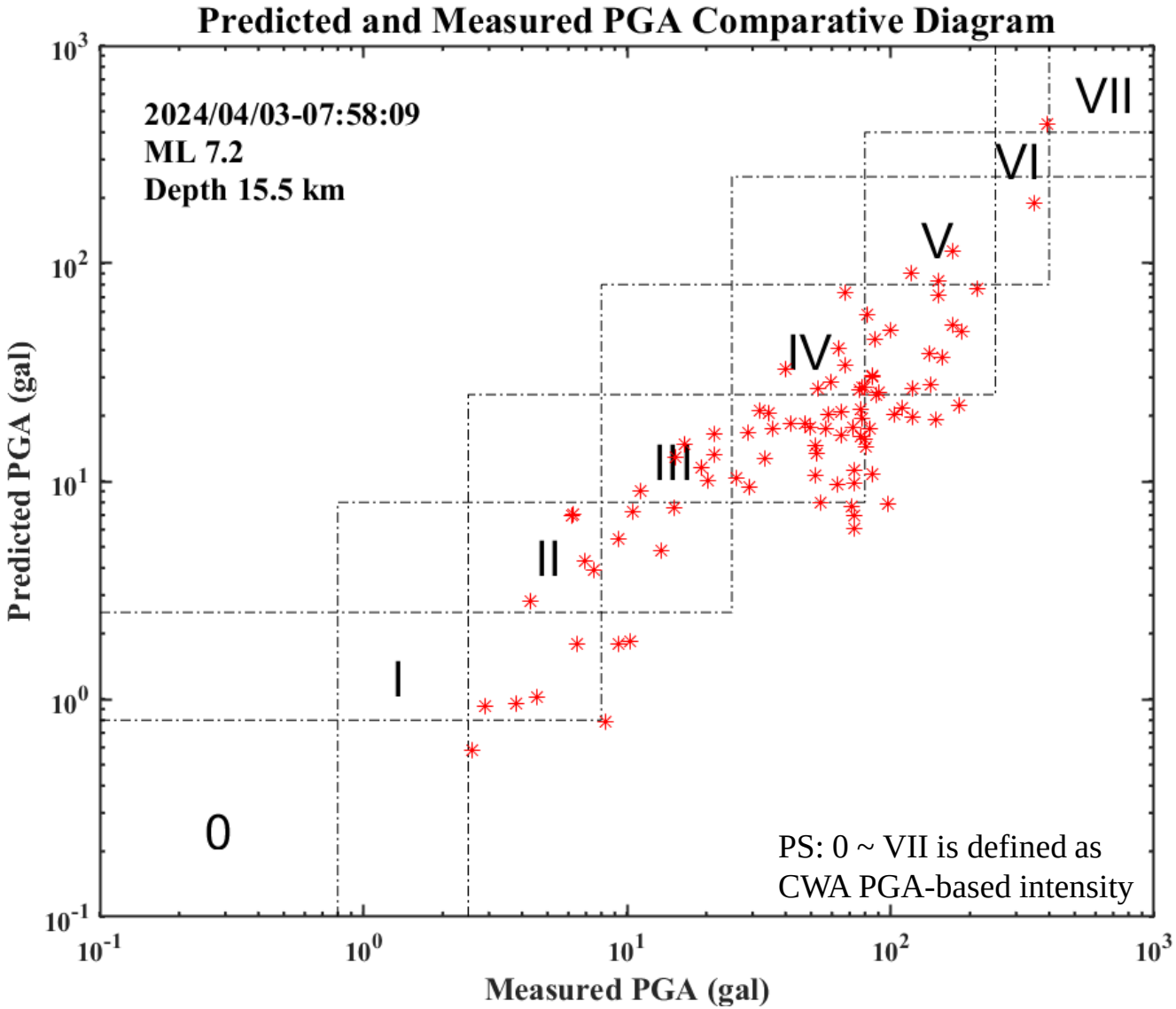


NCREE On-Site EEWS
Trigger and Arrival Times





NCREE On-Site EEWS
Predicted and Measured Intensities



Outline

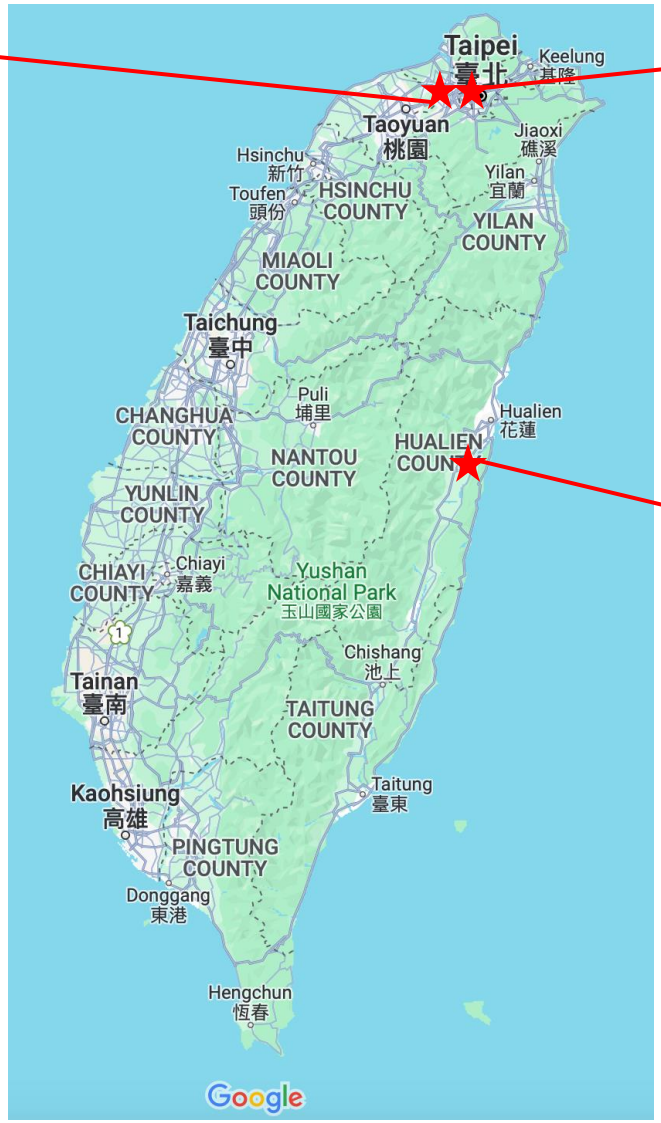
- Seismic Source and Ground Motion Characteristics
- Early Seismic Loss Estimation
- NCREE EEWS Performance
- Bridge Damage
- Building Damage
- Geotechnical Damage
- Non-Structural Component (NSC) Damage

NARLabs

Bridge Damage Locations

Crescent Bridge

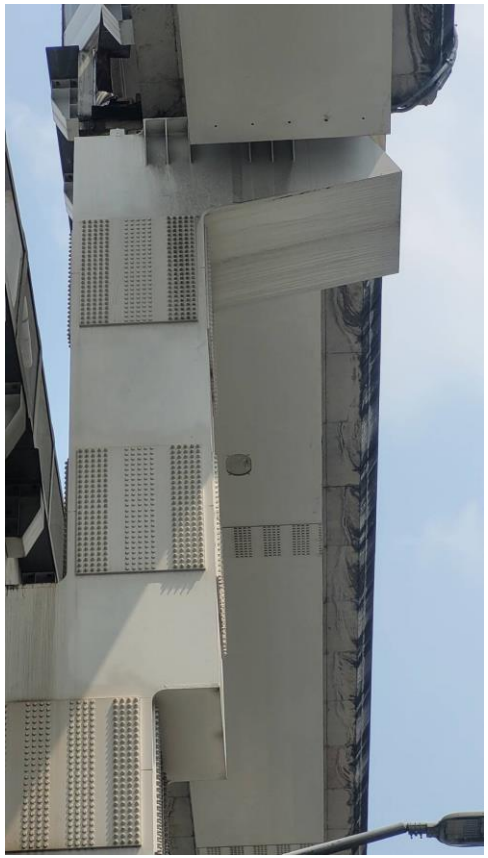
Taipei Metro Circular line



Xiaqingshui Bridge

NARLabs

Taipei Metro Circular line



- The damaged part of the circular line was near the intersection between Banxin Road and Section 2, Sanmin Road, Banqiao District, New Taipei City. P1319~P1316.
- The pier columns' bases were still intact, but the main beam shifted horizontally, and the drainage pipe joints were damaged and have fallen onto the ground.

Xiaqingshui Bridge

NARLabs

Hualien

The Xiaqingshui Bridge fractured with falling rocks.

Source:
Highway Bureau, Ministry of Transportation and Communications
Ettoday News
UDN News

Crescent Bridge

NARLabs

New Taipei City

The suspension cables of the New Taipei City Crescent Bridge were loosened. The main section was closed for inspection immediately.

Source:
New Taipei City Government
FTV News
Newtalk News
UDN News

Outline

- Seismic Source and Ground Motion Characteristics
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8-story Residential bldg. .

Yanhe Rd., Tucheng Dist., New Taipei City

Source:
https://udn.com/news/story/7320/7874570
https://www.cdns.com.tw/articles/987697

1st floor column core concrete was crushed. The spacing of the reinforcement bars was too large.

Residential bldg.

Puyan Township, Changhua County

花蓮地震 彰化埔鹽平房倒塌幸無人受傷

2024/4/3 12:27（4/3 13:39 更新）

花蓮近海3日上午發生強震，造成彰化縣埔鹽鄉埔港路一處平房倒塌，一對母子及時逃出未受傷，因房子已不能居住，鄉公所協助安置2人。（民眾提供）中央社記者鄭維真傳真 113年4月3日

Brick house collapsed

Source: https://www.cna.com.tw/

NARLabs

Residential bldg.

Bade Dist., Taoyuan City

0403花蓮大地震／桃園三元吉第大廈嚴重掉磚 43名住戶安置活動中心

2024-04-03 12:02 聯合報／記者周嘉苑／桃園即時報導

桃園市八德區「三元吉第大廈」內發生大面積磁磚脫落，只見大樓一樓入口外的牆壁磁磚掉滿地，大廈樑柱磁磚也剝落。圖／讀者提供

Exterior wall tiles fell off

Source: https://udn.com/

Residential bldg.-Hualien City, Hualien County

統帥大樓外牆磁磚剝落。（圖／葉章辰攝）

花蓮北濱街地震，早餐店傾斜。（民眾提供）

花蓮北濱街房屋傾斜。記者王燕華／攝影

Shear failure of exterior walls and beams

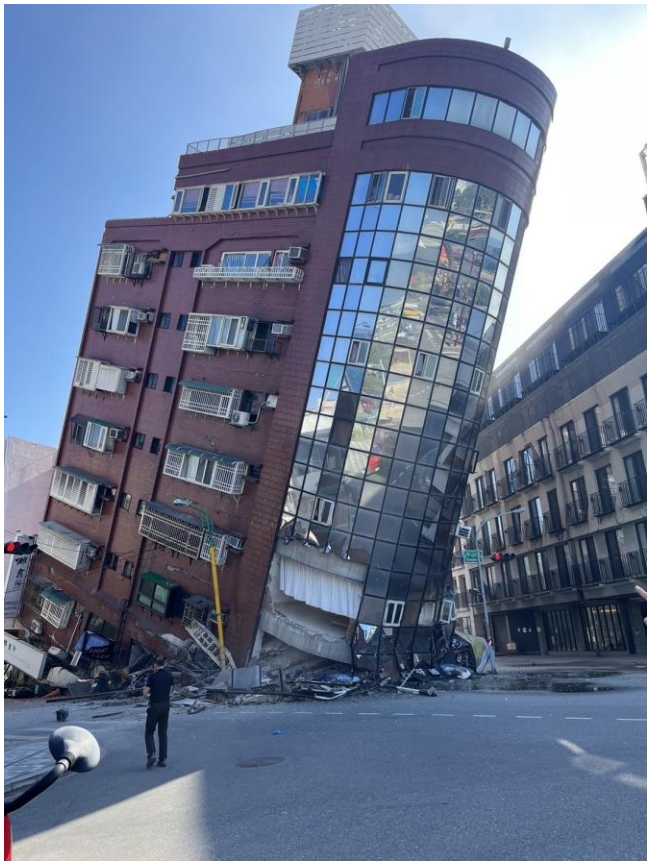
Source:
https://news.tvbs.com.tw/local/2446040

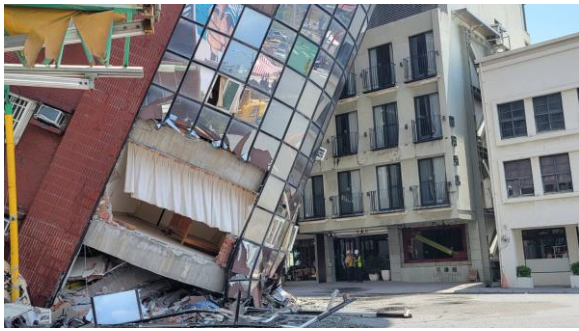
Soft-weak story failure

Source:
https://www.chinatimes.com/realtimenews/20240403001205-260405?ctrack=pc_main_recmd_p08&chdtv
https://udn.com/

NARLabs

Residential bldg.-Hualien City, Hualien County



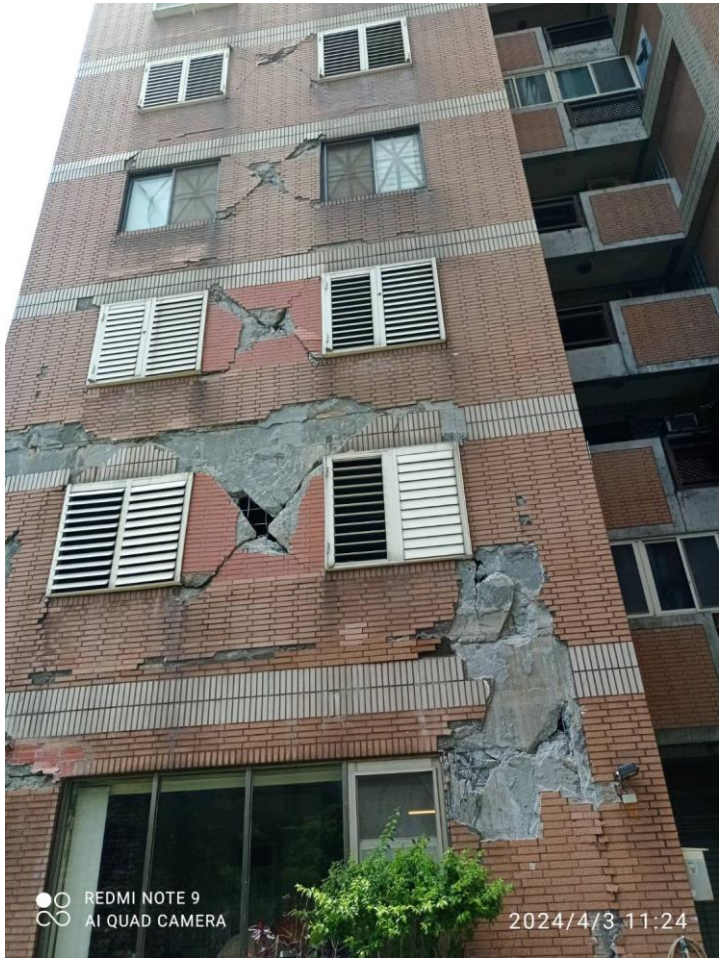


Collapsed due to the weak first-story columns

Source:
https://www.chinatimes.com/realtimenews/20240403001232-260402?ctrack=pc_main_rtime_p05&chdtv
https://udn.com/news/story/123995/7874951?from=udn-relatednews_ch2
Google map

Residential bldg.

Ji'an Township, Hualien County



Source:
歐陽昇建築師
江文卿技師
Google map

Exterior wall shear failure and tile fell off

Old masonary bldg.

Zhongzheng Dist., Keelung City

After the earthquake

Before the earthquake

Source:
https://tw.news.yahoo.com/
Google map

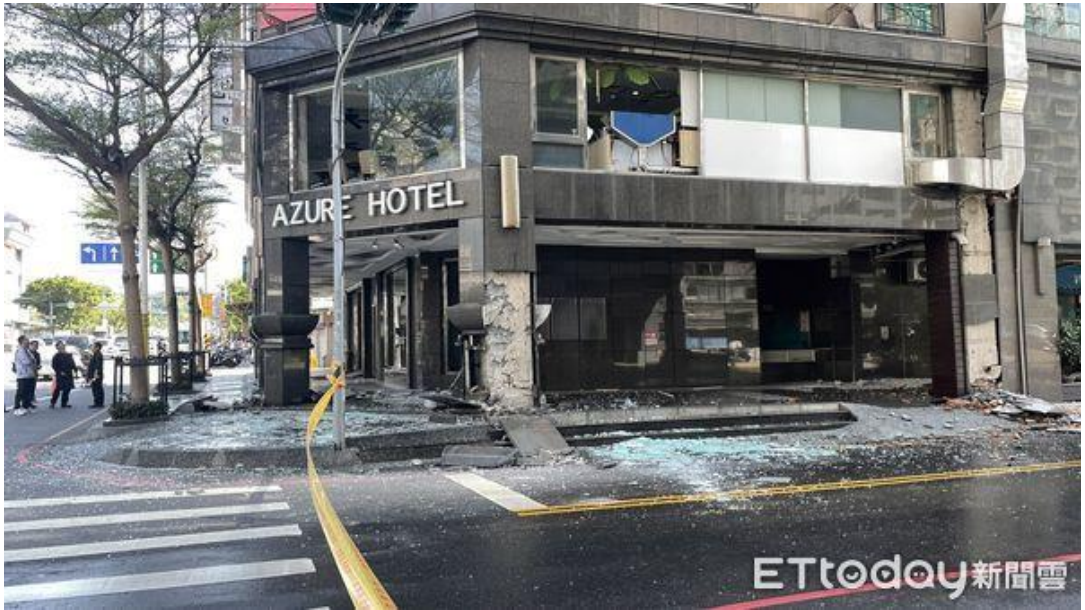
The beams and columns on the 2nd floor of the brick building were damaged and fell off

Hotel

Yongxing Rd., Hualien City, Hualien County

The column cladding stone fell off, the protective layer of concrete cracked, and the column stirrup spacing was too large.

Source:
https://tw.news.yahoo.com
Google map



Column cladding stone fell off

Source:
https://www.ettoday.net/news/20240403/2712484.htm
Google map

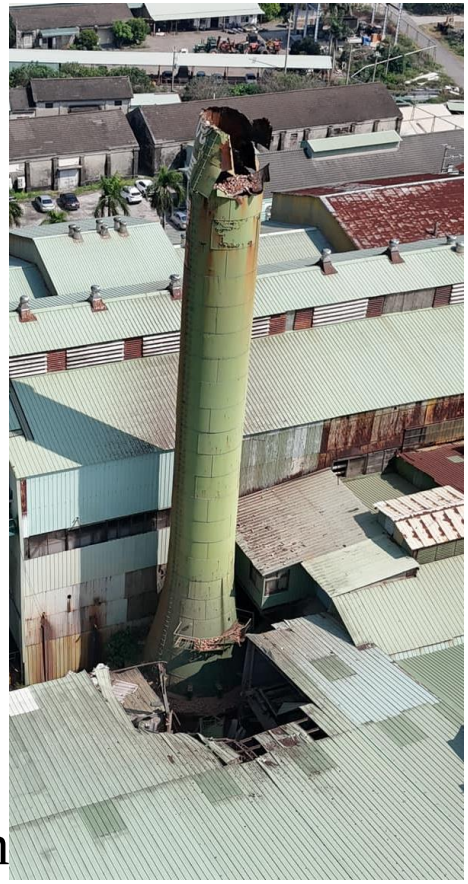
Office bldg.

Changhua City, Changhua County

Source:
https://money.udn.com/money/story/5648/7874073?from=edn_newest_index

Tiles fell off

Chimney of Huwei Sugar Factory in Yunlin County

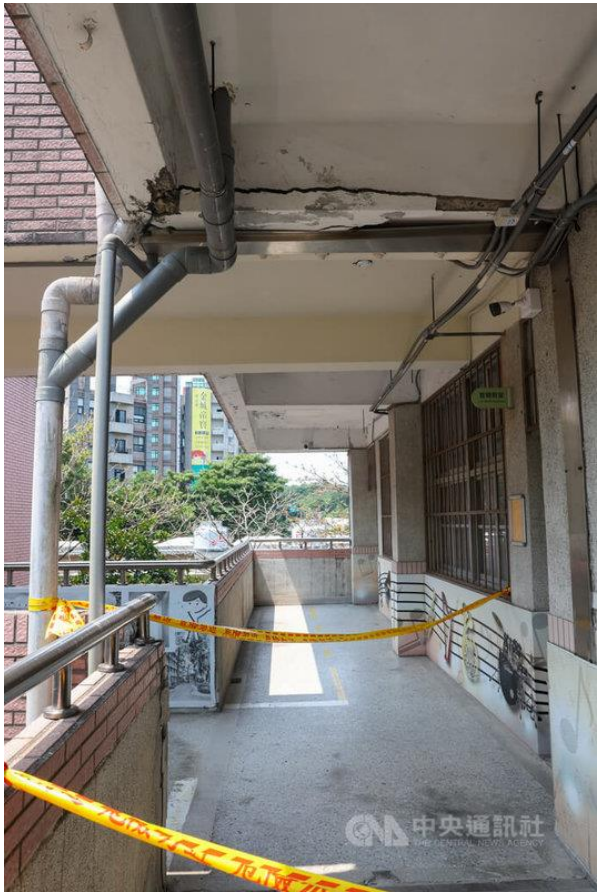


The chimney was damaged by the main earthquake. Collapsed during aftershocks

Source:
https://tw.news.yahoo.com/
Facebook Sikorsky Chang

School bldg.

Taipei Municipal Minzu Experimental Junior High School

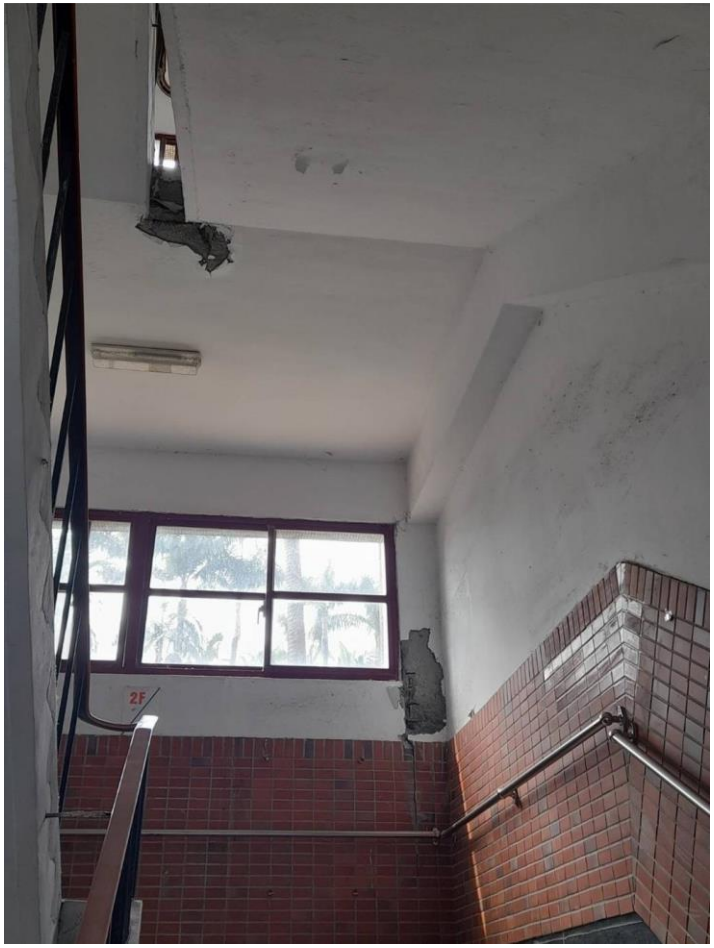


Building collision causing protection layer of concrete to fall

Source:
https://www.ettoday.net/news/20240403/2712453.htm
https://www.cna.com.tw/news/aloc/202404030074.aspx

School bldg.

Taipei JingMei Girls High School

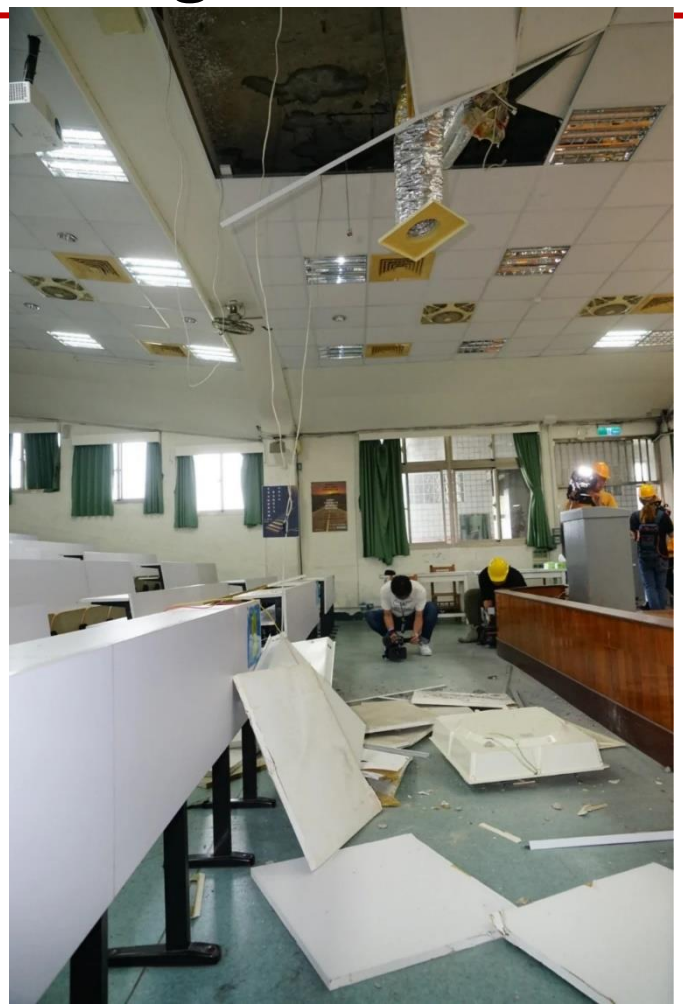


The concrete in the stairwell was peeling off and the light fixtures were damaged.

Source:
https://www.chinatimes.com/realtimenews/20240403002098-260405?chdtv

School bldg.

Taipei Municipal Cheng Zheng Junior High School



Concrete finish was torn off at the bottom of beams and ceilings fell off

Source:
https://tw.news.yahoo.com/

School bldg.

The Affiliated Senior High School of National Taiwan Normal University, Taipei

Cracks appear at the discontinuities in the building's structural facade, cracks appear in the floor, and the brick walls were convex and tilted.

Source:
https://www.ettoday.net/news/20240403/2712614.htm

School bldg.

National Hualien Girls High School, Hualien County

The short column effect caused column shear damage and excessive column stirrup spacing.

Source:
https://www.chinatimes.com/realtimenews/20240403001601-260402?chdtv

Market

Daxi Dist., Taoyuan City

花蓮近海3日上午發生規模7.2地震，桃園大溪區三元二街一處私人市場內梁柱出現明顯裂縫且傾斜。（大溪區公所提供）中央社記者吳睿騏桃園傳真 113年4月3日

Column head cut off by shear force

Source: https://www.cna.com.tw/

Storehouse

Zhonghe Dist., New Taipei City

The rear half of the 5-story factory storehouse collapsed

Source:
https://udn.com/news/story/123995/7874069
https://tw.news.yahoo.com/
https://www.chinatimes.com/realtimenews/20240403001261-260402?chdtv?utm_source=dable&utm_medium=referral&utm_campaign=recmd1

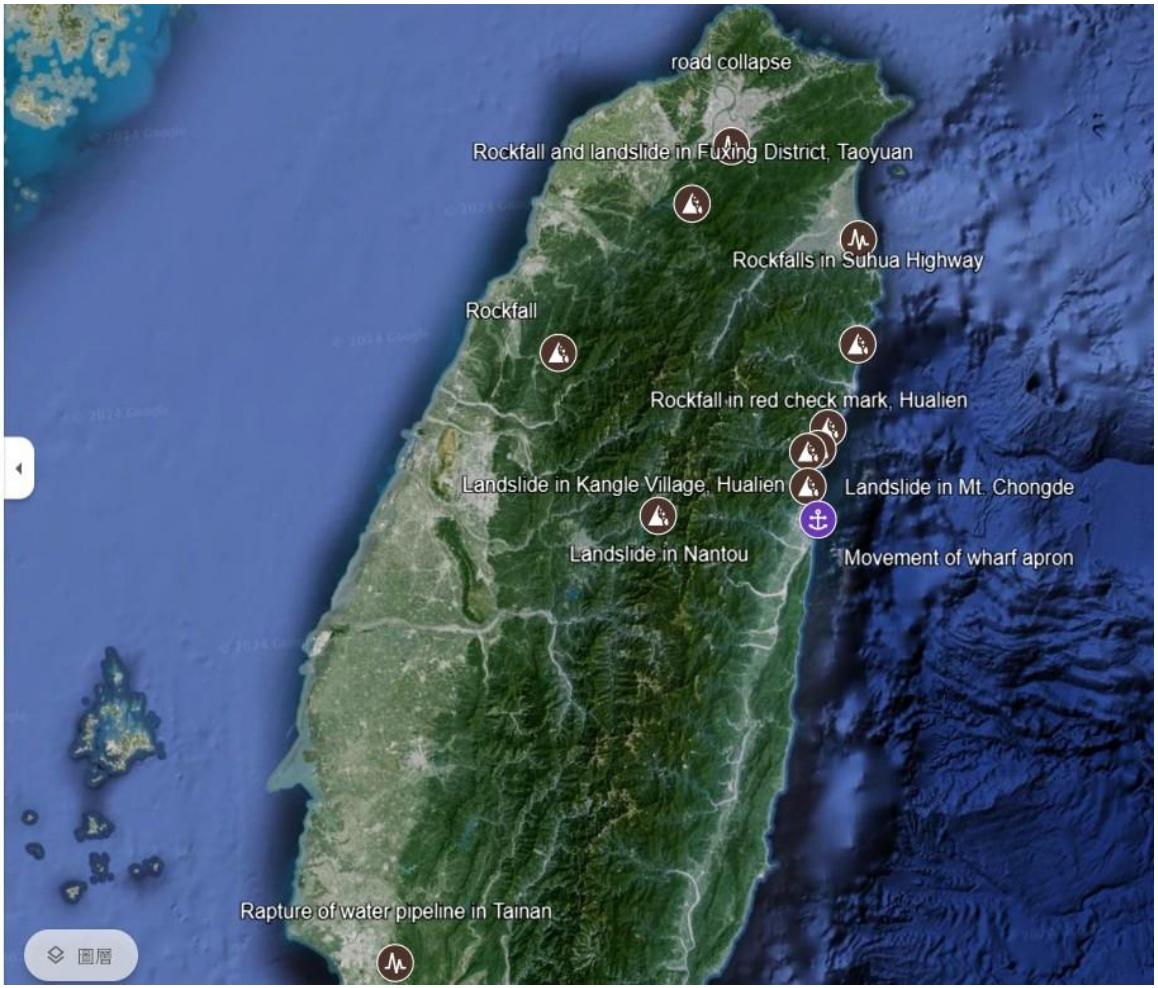
Outline

- Seismic Source and Ground Motion Characteristics
- Early Seismic Loss Estimation
- NCREE EEWS Performance
- Bridge Damage
- Building Damage
- Geotechnical Damage
- Non-Structural Component (NSC) Damage

NARLabs

Geotechnical Damage Locations

- Rockfall
- road collapse
- Movement of wharf apron
- Landslide in Kangle Village, Hualien
- Landslide in Nantou
- Rapture of water pipeline in Tainan
- Landslide in Mt. Chongde
- Landslide in Daqingshui Tunnel
- Road bumps and rupture in I-Lan
- Rockfall and landslide in Fuxing District, Taoyuan
- Rockfalls in Suhua Highway
- Rockfall in red check mark, Hualien

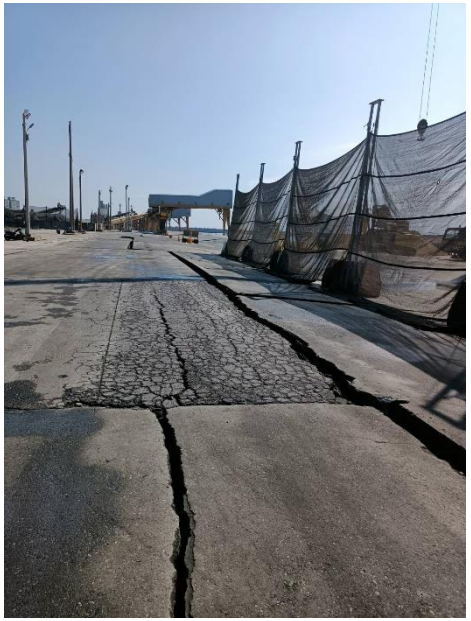


NARLabs

Port of Hualien

- Settlement observed in the caisson backfilled zone, the elevation difference between the caisson and the backfilled zone was approximately 15-50 cm.

- Displacement observed at the wharf apron; significant cracks observed on the loading dock.



Source: TIPC

NARLabs

Landslides

- Severe landslides occurred along Suhua Highway. Massive rock blocked the entrance of the Chongde Tunnel. The loss of roadbed occurred about 30 m in front of the north entrance of Daqingshui Tunnel; the roadway entirely disappeared.

Source: Yahoo News

Chongde Tunnel

Daqingshui Tunnel

NARLabs

Landslides

- Severe landslide events occurred at multiple mountains caused transportation disruptions of highways and railways.

- Guishan Island

Source: UDN News

- Mt. Chongde, Hualien

Source: TVBS News

- Kangle Village, Xincheng, Hualien

Source: TVBS News

NARLabs

Other Geotechnical Damage

- Roadbed collapsed in front of an apartment complex and caused the loss of the building foundation in Xindian, New Taipei

Source: China Times

NARLabs

Other Geotechnical Damage

- Flooding occurred in Tainan due to water pipeline damage.

Source: China Times

- Multiple cases of pipeline damage were reported for both water and gas supply systems in Hualien.
- Transportation to Hualien is disrupted for highway and railway due to landslides and rockfalls in Hualien.

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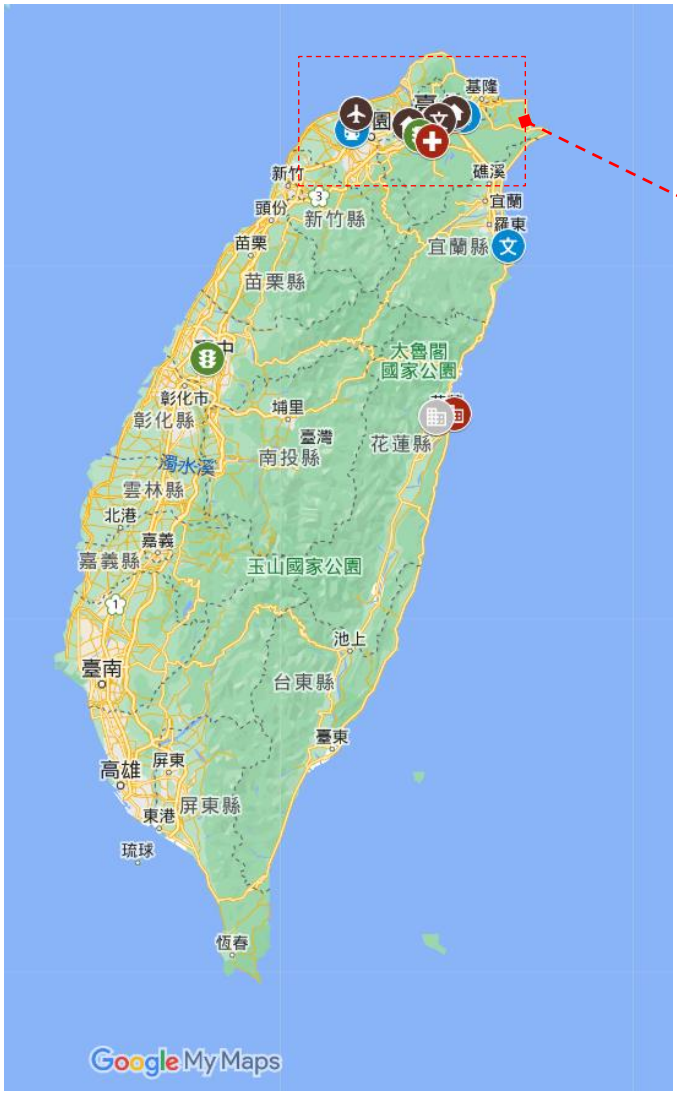
NARLabs

List of specified NSC damage

	City or County	Building type	NSC type	Damage descriptions	Links 1	Links 2	Links 3	Links 4
1	Taoyuan	Transportation facilities	Architectural components	Dislodged ceiling panels and racked smoke barrier	UDN	經濟日報		
2	Taoyuan			Fallen ceilings	UDN	SETN	YAHOO	YAHOO
3	Taipei			Fallen ceilings	Taisounds			
4	New Taipei			Fallen ceilings	ETtoday			
5	Yilan	School		Fallen ceilings	UDN			
6	Taipei	Commercial building		Cracked glass facade	ETtoday			
7	Taipei			Collapsed signboard	UDN			
8	Taipei	Residential building	Equipment	Collapsed water tanks	UDN	CNA		
9	Taoyuan	Transportation facilities		Collapsed overhead crane	民視新聞網			
10	New Taipei	Building under construction		Damaged tower crane	ETtoday	CNA		
11	Hualien	Commercial building	Piping Systems	Broken water piping	YAHOO			
12	New Taipei	Hospital		Broken water piping	YAHOO			
13	Hualien	Commercial building	Contents	Damaged ossuary cabinets	更生日報			
14	New Taipei	Road	Street furniture	Collapsed street signpost	ETtoday			
15	Taichung			Damaged traffic signal	UDN			

Specified NSC Damage Locations



- **Architectural Components**
  (Ceiling; smoke barrier; glass facade; signboard)
- **Equipment**
  (Water tower; overhead crane; tower crane)
- **Piping Systems**
  (Suspended piping systems)
- **Contents**
  (Ossuary cabinets)
- **Street furniture**
  (Street signpost; traffic signal)

Map of Taiwan, *Google Maps.* Accessed 3 Apr. 2024.

1. Taiwan High Speed Rail (THSR) Taoyuan Station

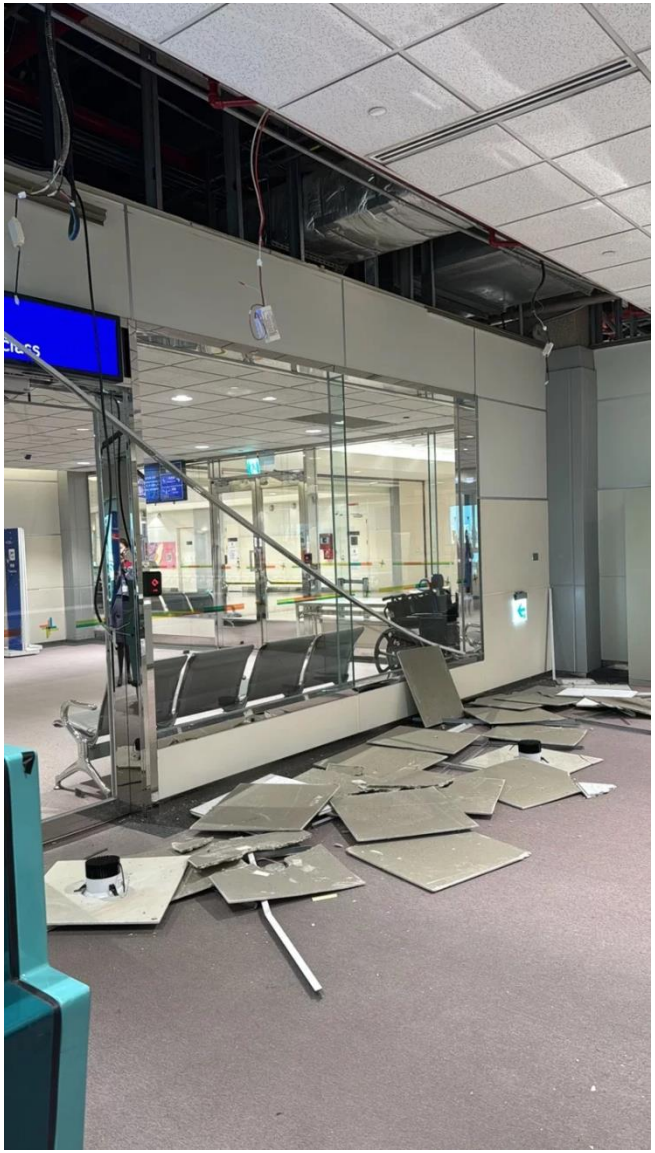
Dislodged ceiling panels (marked in the left and right photos) and cracked smoke barriers (marked in the middle photo) were observed in the lobby of THSR Taoyuan station.

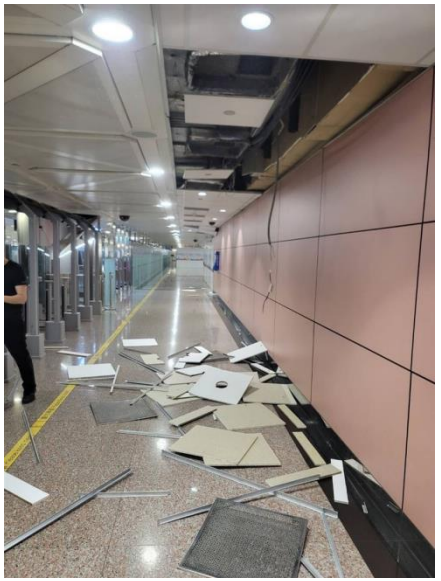
Source: https://money.udn.com/money/story/122328/7874021
Source: https://udn.com/news/story/7314/7874021

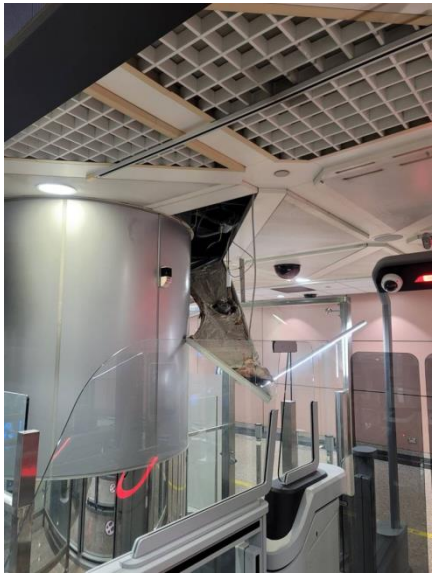
NARLabs

2. Taiwan Taoyuan International Airport

Local collapse of the grids and loss of ceiling panels were found in the airport terminal.







Source: https://www.setn.com/News.aspx?NewsID=1448613

Source: https://udn.com/news/story/7314/7873951

3. Taipei MRT Daan Station

Some ceiling panels were dislodged or even fell down at Taipei MRT Daan Station.

Source: https://www.taisounds.com/news/content/139/117936

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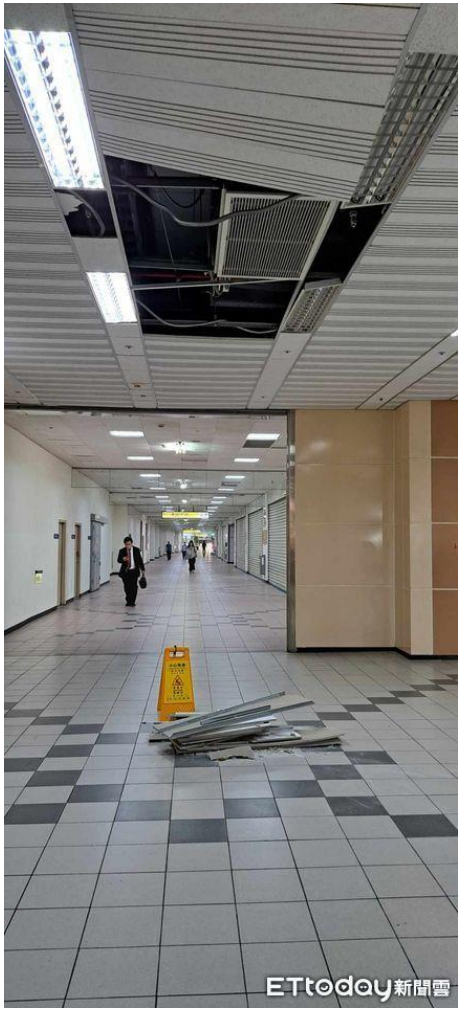
4. Taiwan Railway (TR) Xizhi Station

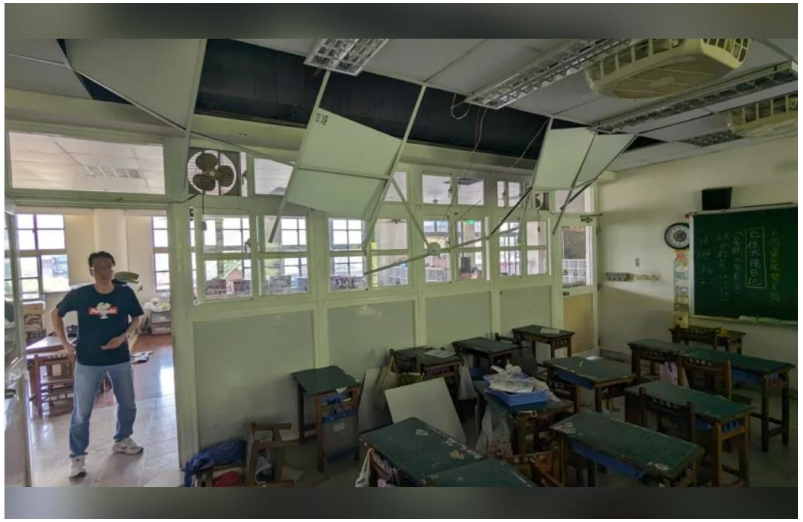


Ceiling panels and grids fell down in the lobby of TR Xizhi Station in New Taipei City.

Source: https://www.ettoday.net/news/20240403/2712294.htm

5. Suao Elementary School

Some ceiling panels and grids were dislodged or even fell down in the fourth-floor classrooms of Suao Elementary School in Suao Township of Yilan County.



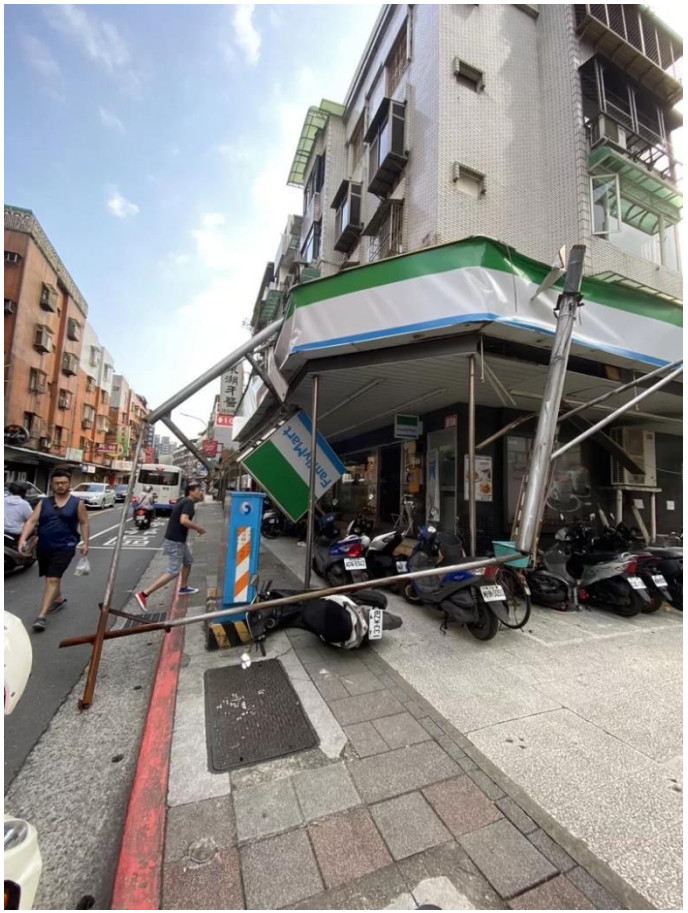
Source: https://udn.com/news/story/123998/7875235

6. SOGO Dunhua Store

A piece of glass facade of SOGO Dunhua Store was broken in Taipei City.

Source: https://www.ettoday.net/news/20240403/2712301.htm

7. Convenience store in Taipei City



Signboards of a convenience store collapsed in Neihu District of Taipei City.

Source: https://udn.com/news/story/123995/7873941

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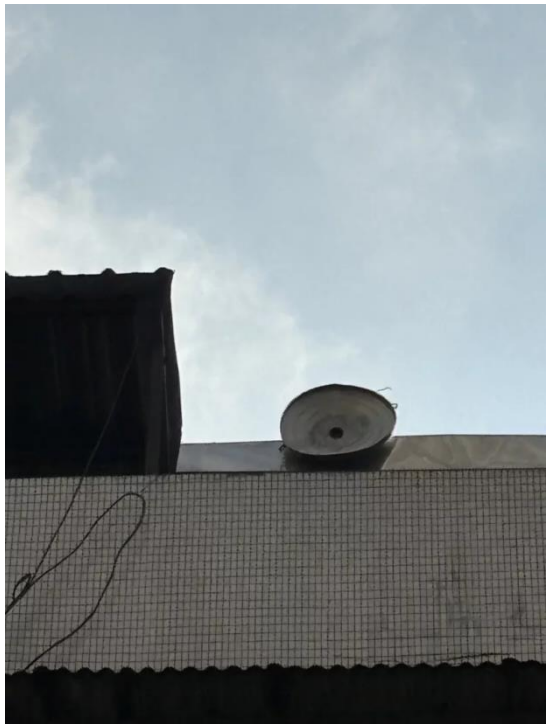
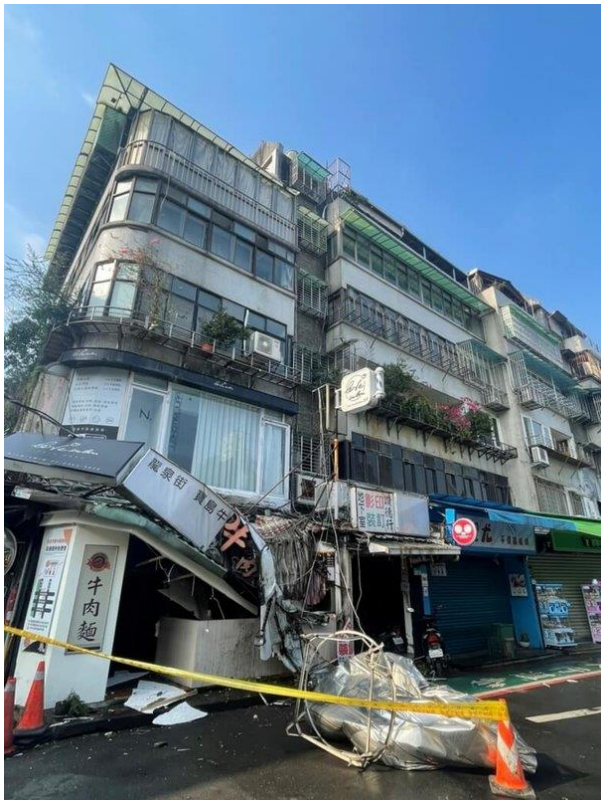
8. Residential buildings in Taipei City



A water tank collapsed at the top of the residential building on Kangle Street in Neihu District of Taipei City.

Source: https://udn.com/news/story/123995/7873941



A water tank dropped from the top of the building in Daan District of Taipei City.

Source: https://www.cna.com.tw/news/aloc/202404030154.aspx

9. Taiwan Taoyuan International Airport

The overhead crane in the maintenance hangar collapsed in Taiwan Taoyuan International Airport (TPE).

Source: https://www.4gtv.tv/article/2024040310000011

10. Building Under Construction in New Taipei City

The boom of the tower crane on the roof of the building under construction was damaged in Xinzhuang District of New Taipei City.

Source (Left picture): https://www.ettoday.net/news/20240403/2712432.htm
Source (Right picture): https://www.cna.com.tw/news/asoc/202404030109.aspx

11. Lakeshore hotel Hualien

The suspended piping system failed and led to flooding damage in the corridor in Lakeshore Hotel Hualien.

Source: https://tw.news.yahoo.com/%E8%8A%B1%E8%93%AE7-2%E5%A4%A7%E5%9C%B0%E9%9C%87-%E7%85%99%E6%B3%A2%E5%A4%A7%E9%A3%AF%E5%BA%97%E5%A4%A7%E6%B7%B9%E6%B0%B4-%E8%B5%B0%E5%BB%8A%E7%A7%92%E8%AE%8A-%E6%B1%AA%E6%B4%8B-013013239.html

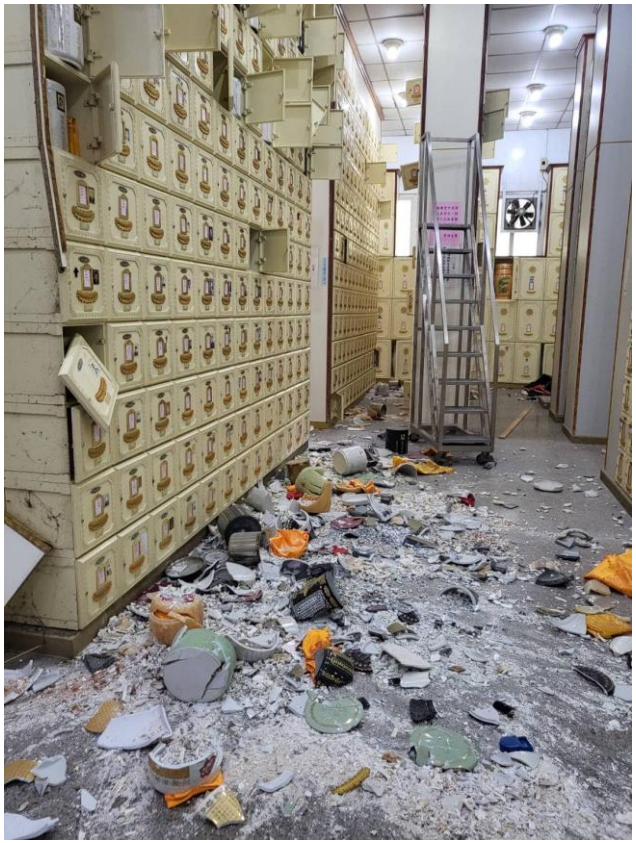
12. Cardinal Tien hospital in New Taipei City

The water piping system failed, causing flooding damage in Cardinal Tien Hospital in the Xindian District of New Taipei City.

Source: https://tw.news.yahoo.com/%E5%BF%AB%E8%A8%8A-%E5%BC%B7%E9%9C%87%E6%9C%89%E6%84%9F-%E8%80%95%E8%8E%98%E9%86%AB%E9%99%A2%E6%B0%B4%E7%AE%A1%E7%82%B8%E8%A3%82-%E6%A8%93%E9%9D%A2%E6%B7%B9%E6%B0%B4%E6%90%B6%E4%BF%AE%E4%B8%AD-012930089.html

13. Ciyunshan Columbarium in Hualien

The urns dropped and ossuary cabinets were damaged in Ciyunshan Columbarium in Ji'an Township of Hualien County.



Source: https://www.ksnews.com.tw/w2024040303/

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14. Elevated road

A street signpost collapsed on the No. 64 express way near Zhonghe District of New Taipei City.

Source: https://www.ettoday.net/news/20240403/2712325.htm

15. Public road

A traffic signal was damaged at the intersection between Fuxing North Road and Xiyuan Road in Xitun District of Taichung City.

Source: https://money.udn.com/money/story/5648/7874074

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NCREE will continue to monitor and collect information on the ongoing disaster.

The End