

## 3.2 Disaster Response

### 3.2.1 Progress of Damage

Damage of 1999 Chi-Chi earthquake result in as follows, 1) Human Casualties: 2,494 dead, 11,305 injured, 2) Building Damage; 51,962 major building damage, 54,332 moderate building damage and 3) Economic Impact; 11.5 billion New Taiwan Dollar (NTD). Figure 3.2.1 shows the progress of human casualties.

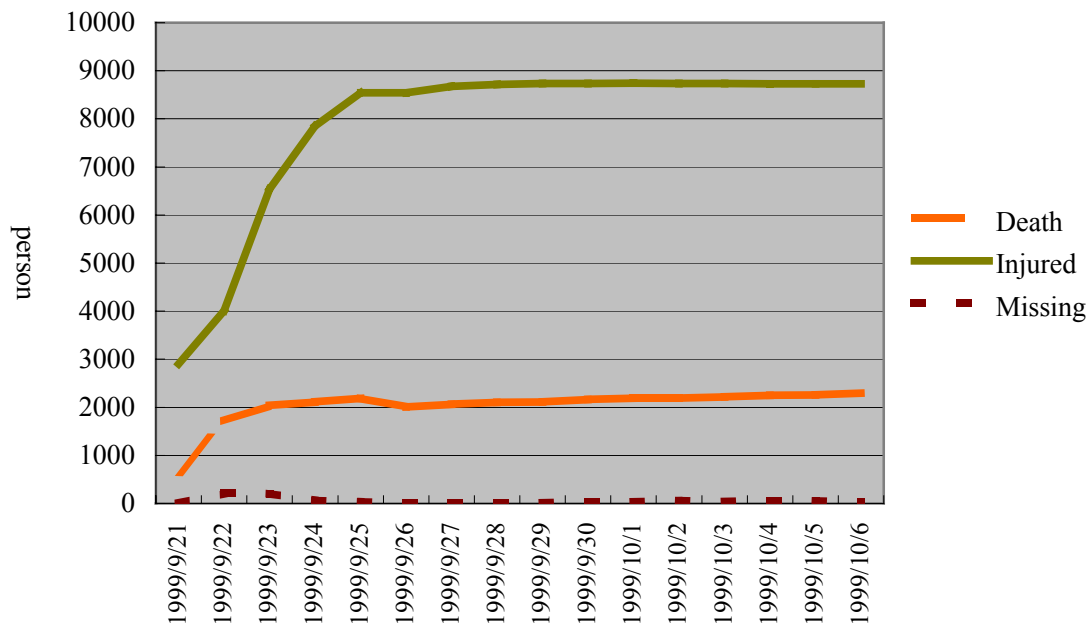


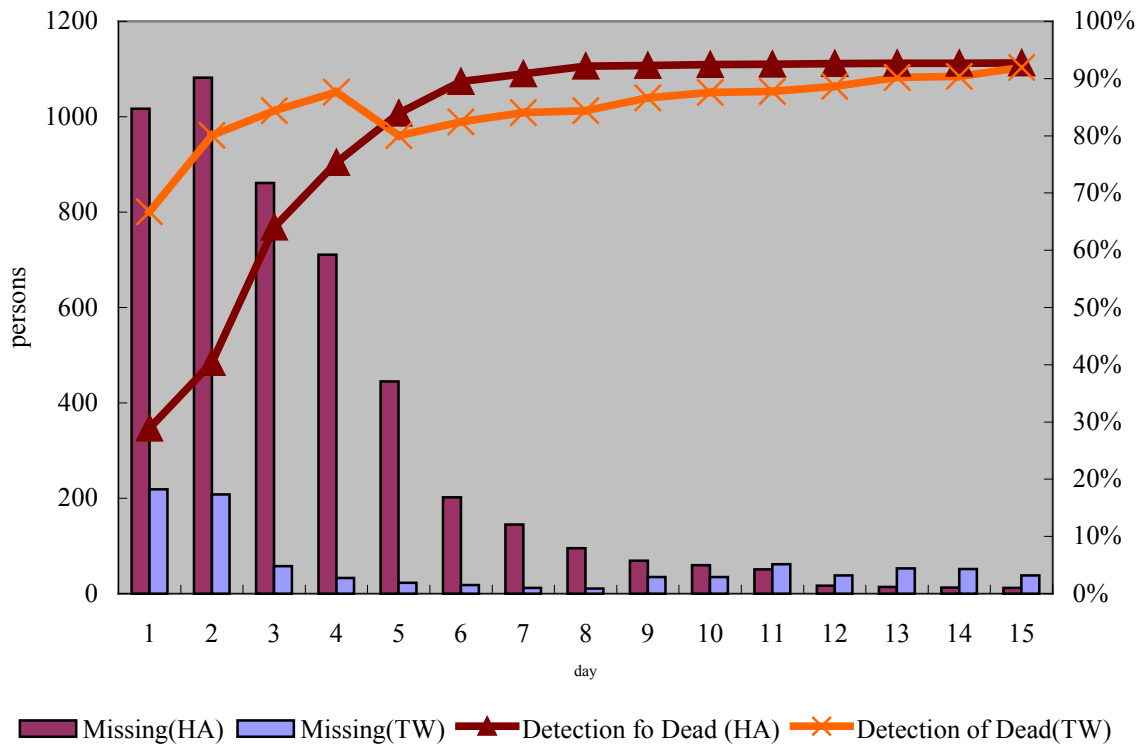
Figure 3.2.1. Progress of human casualties.

\*This data is distributed from National Center for Earthquake Engineering, Taiwan.

### 3.2.2 Disaster Response

#### *Emergency Response*

The start of emergency response in Chi-Chi Earthquake Disaster was fast. Soon after the event, the headquarter for emergency response was set up. President and Vice President went to the impacted area same day of the event. The menus for relief countermeasures were published in the evening of same day. Compare to Hanshin-Awaji Earthquake, the start of emergency response was apparently fast. The flow of disaster response is shown in Table 3.2.1. Though the start of emergency response of Hanshin-Awaji Earthquake was delayed, Emergency response of Hanshin-Awaji Earthquake Disaster was conducted very effectively. Figure 3.2.2 show the progress of number about missing and the detection rate of dead. At first, the detection rate for dead of Hanshin-Awaji Earthquake Disaster was low but it exceeds that of Chi-Chi earthquake disaster in fifth day. About the missing people, the number of missing for Hanshin-Awaji Earthquake Disaster becomes smaller than that of Chi-Chi Earthquake Disaster from eleventh day.



\* The number of Direct Death in Hyogo Prefecture is used the number of dead of Hanshin-Awaji Earthquake Disaster. The number of direct death is 5,480.

Figure 3.2.2. Detection rate of dead and the number of missing people.

### Relief and Recovery

The point of disaster response in Chi-Chi Earthquake Disaster is 1) All the menu for relief countermeasures were published on 21 Sep., 2) One stop center for disaster victims where all the procedure about getting public support, was established, 3) Subsidy from the government was distributed according to the building damage level, 4) The multiple plan for interim housing were prepared. 5) Extralegal order by President was declared to conduct countermeasures of disaster. 6) “Bottom up” was set for primary policy for reconstruction. Following is the analysis about each point.

The menu for relief was consisted from 15 items at first (later it becomes 19 items). Leaflet writing 19 items were distributed to each victim (Figure 3.2.3). This menu consisted from following contents, 1) Subsidy from government for dead, Heavily Injured, Major housing damage and Moderate hosing damage. 2) Sheltering, 3) Budget for disaster response, 4) Housing recovery, 5) Tax reduce for victims, 6) Medical Support, 7) Building Safety, 8) Feeding, 9) Stabilizing price, 10) Donation, 11) Impacted Student Support, 12) General consultation about reconstruction using telecommunication, 13) Responsible department of government for disaster response, 14) Support by Army, 15) Sanitation, 16) Support for occupation, 17) Safety inquirer, 18) Census register and children, elder person losing relatives, 19) Traffic and Postal. In case of Hanshin-Awaji Earthquake, the menu for support victims were offered one and after. It made the victims waiting for new and better condition of government support. And many victims cannot decide the vision for individual recovery. The entire support menu for victims should be published at first like Taiwan case.

Table 3.2.1. Chronograph of disaster response.

	Organizations	Secure Life and Safety	Recovery of Flow	Reconstruction of Stock
1999/9/21	Soon after the event/921Taiwan Earthquake Emergency Response Center	AM2:30/Order for SAR (Dep.of Defense)	Electricity supply/reduced from 982mw to 400mw and will recover on 23 Sep.	
	AM2/Disaser Response Center of Fire Dep.	AM4/Organized SAR operation begun		
	AM/President and Vice President visit affected are			
		Evening/Japanese SAR team arrive	PM8:30/15 Countermeasures for Relief is published	
1999/9/22			Though Bank and Foreign Exchange market will open from 22 Sep., Taiwan stock exchange will be closed.	
			Disruption of telecommunication for	
			Though 690M households blackout, 1/3 households in northern Taiwan has	
	Night/Relief Operation Center, Vice President stay in impacted area.		The recovery policy of electricity supply has changed from private use to industry	
1999/9/23	Special Budget for recovery has established.		Telecommunication has recovered	
			Traffic operation has recovered without severer	
			Electricity supply recover will delay for the damage of substation for major root.	
			Water supply has stopped in 28M households.	
			Taipei stock market will start from 27 Sep.	
1999/9/24		SAR operation will continue until 100h.		The households whose house is not able to repair will be subsidized.
			Two alternative for shelter, 1) Temporary housing of 26.4m2, 2) Subsidy for rental house for 1 years.	
1999/9/25	President Order Beyond the Law		Electricity supply for Shinchiku, industrized area,	
1999/9/26				30% discount Public house will be sold.
1999/9/27			Countermeasures for Sheltering and Waste will be complete in a month.	
			Bank operation has been	
			Taipei stock market has been recovered.	
1999/9/28			Electricity supply/ Private;7 houses black out, Industry; Blackout from 5pm-10:30 pm recover will delay for the damage of substation for major root.	
1999/9/29				Law interest loan for double housing loan.
				5 reconstruction policies, 1) Housing, 2)Community, 3) Building Code, 4) Safety of Public Built Environment, 5) Farm land.

One stop center for victim's support is the same way with disaster response by FEMA. It can reduce suffers of victims without going to many times for public agencies. Many government officials from non-impacted area supported to manage this center. However, Mayor of each local government stayed this center all the time and managed the trouble between victims.



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delayed. It is same problems about Hanshin-Awaji Earthquake Disaster. Even though there was no consensus about what kind of index is appropriate for the application index for individual assistance, the level of building damage has become a de facto standard for the application index of individual assistance. In case of Taiwan, Architectural University Students conducted building damage assessment and made a survey sheet (Figure 3.2.4) attaching photograph. This system can be helpful to Japan.

村名	八仙村	調査日期	1999/10/6
路名			
門牌號碼			
使用類型	<input type="checkbox"/> 住 <input type="checkbox"/> 住商 <input type="checkbox"/> 公 <input type="checkbox"/> 宗教 <input type="checkbox"/> 其他		
樓層數	<input type="checkbox"/> 1樓 <input type="checkbox"/> 2樓 <input type="checkbox"/> 3樓 <input type="checkbox"/> 4樓 <input type="checkbox"/> 5樓 <input type="checkbox"/> 其他		
構造	<input type="checkbox"/> 土角 <input type="checkbox"/> 磚造 <input type="checkbox"/> 加強磚造 <input type="checkbox"/> R.C <input type="checkbox"/> 鐵皮屋 <input type="checkbox"/> 其他		
形態	<input type="checkbox"/> 三合院 <input type="checkbox"/> 平房 <input type="checkbox"/> 街屋 <input type="checkbox"/> 兩棟透天 <input type="checkbox"/> 三棟透天 <input type="checkbox"/> 別墅 <input type="checkbox"/> 其他		
外觀材質	<input type="checkbox"/> 磚 <input type="checkbox"/> 水泥粉刷 <input type="checkbox"/> 洗石子 <input type="checkbox"/> 馬賽克 <input type="checkbox"/> 二丁掛 <input type="checkbox"/> 磁磚 <input type="checkbox"/> 其他		
損壞狀況	<input type="checkbox"/> 紅 <input type="checkbox"/> 黃 <input type="checkbox"/> 綠、說明：		
照片圖示			
備註			

Figure 3.2.2. Building damage survey sheet in Taiwan.

Multiple menu for interim housing were prepared, 1) Public provision temporary housing, 2) Subsidy for rental fee of private apartment for 1 year, 3) Purchasing the 30 % discount public housing. Over 90% people have selected the rental fee support. The support for rental fee was conducted paying cash without checking the fact about renting the house. It seems that many people got money without renting house and lives in the damaged house or house of relatives. Though this method was same with support by FEMA after Northridge earthquake, FEMA did not pay by cash but by coupon. After Hanshin-Awaji Earthquake-Disaster, JIA made an advocacy that the multiple provisions for interim housing are more appropriate than that of only by the temporary housing. What will happen to the victim who selected the subsidy for rental fee should be surveyed.

Regal system about reconstruction from natural disaster in Taiwan was limited. In response phase, there was no basic regulation for disaster management. In recovery phase, there was no law to regulate new construction in heavily impacted area. And Extralegal Order by President for relief and reconstruction was declared on 25 Sep. The contents of this Order were about the confirmation of impacted area, the level of damage, coordination of relief goods, conscription of land and budget etc. This order did not be regulated from existing law. However, it seems that disaster management should be conducted under the regulation of existing law to prepare for future disaster. If there is no fixed standard of public support for disaster victims, the incentive to mitigation and preparedness for future damage becomes low.

One lesson from Hanshin-Awaji Earthquake is that “Bottom up” policy is effective for reconstruction. However, the speed of reconstruction will become late compare to “top down” for it takes time to make consensus. The reconstruction urban planning between Hanshin-Awaji Earthquake and Chi-Chi Earthquake should be compared to clarify the appropriate reconstruction urban planning.

### **3.2.3 Summary**

Disaster response in Chi-Chi earthquake disaster was conducted referring lessons of Hanshin-Awaji earthquake disaster. The advocacy from many institutes should be referred for disaster management in Taiwan. The case in Taiwan deserves to evaluation to make Japanese disaster management better. Continuous survey for disaster process in Taiwan is necessary.

