

Sound Practice No. 1

Kobe City Restoration Plan Rebuilding after the 1995 Great Hanshin-Awaji Earthquake

Overview

Five months after the devastation caused by the Great Hanshin-Awaji Earthquake The Kobe City Restoration Plan was published. This detailed plan extended on every aspect of earthquake recovery, from helping the elderly to rebuilding the correct infrastructure, but with the overall goal of reconstructing the city Kobe into stronger, safer, and internationally vital city.

The Great Hanshin-Awaji Earthquake occurred at 5:46 a.m., 17 January 1995 lasting 20 seconds. The earthquake hypocenter was 20 km southwest of downtown Kobe. The Japan Meteorological Agency assigned a 7.2 magnitude to the event, which occurred along a strike-slip fault.¹ The total loss of life was 4,571, of which 3,891 were in Kobe,² and the other regions affected were Awaji, Ashiya and Nishinomiya, and their surrounding areas. This was the first earthquake in modern history to affect a densely populated urban area in Japan.³ The total loss assessment, which was determined by private sectors and local government, was ~10 million yen.⁴

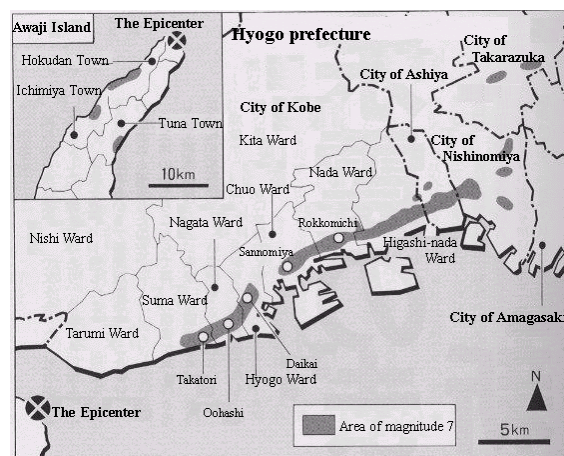


Figure 1. The City of Kobe and location of the epicenter during the 1995 earthquake (Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake, www.city.kobe.jp).

The City of Kobe, within a few months after the earthquake, published a layout for a detailed plan of action, the Kobe City Restoration Plan. The plan intends to “get the citizens’ daily lives back to normal, to restore the functions of our city as quickly as possible,” and to have a “place where people can live with a sense of security.”⁵ The restoration was not only intended to restore Kobe, but to use this as an opportunity to further develop and improve the city as part of a contribution to the “Urban Resort City Development Project.”

¹ P. Somerville, (1995), Kobe Earthquake: An Urban Disaster, Eos, American Geophysical Union, Vol. 76, No. 6, pp. 49-51.

² Kobe City Restoration Plan, Kobe City Government, June 1995.

³ Overview of Kobe. www.city.kobe.jp/cityoffice

⁴ National Report of Japan on Disaster Reduction for the World Conference on Disaster Reduction, Kobe-Hyogo, Japan, 18-22 January 2005, UN-ISDR.

⁵ Kobe City Restoration Plan, June 1995, Kobe City Government.

In the case of the Great Hanshin-Awaji Earthquake in Kobe, everyone was vulnerable, but certain groups of people were more susceptible to vulnerability; the elderly, children, and those uneducated in what to do in the case of a large earthquake. In relation to those groups just listed the vulnerability increased if the types of building in which they resided were not structurally sound for a seismic event. The lack of critical infrastructure, emergency personal, natural disaster preparedness planning, and earthquake resistant buildings resulted in high loss of life and normality in a densely populated urban area. In the case of a large magnitude earthquake devastation is expected, but any methods to reduce loss of lives are essential to make an earthquake prone city less vulnerable.



The restoration process set forth by the City of Kobe has three parts, which are to reduce vulnerability, increase the standard of living, and build a safer city with the residents in mind. Kobe strives for urban conveniences well-balanced with safety precautions. The earthquake revealed to the city leaders the vulnerability of life and they wanted to create a city that guarantees safety as well as the conveniences of urban life.⁶

The restoration of Kobe involves a highly detailed multiple goal plan that reaches across all issues, all scopes of society, and infrastructure. To implement such a large scale plan many small steps are necessary to deal with which issues are the most critical first.

Figure 2. Damaged areas from the 1995 Kobe earthquake. Red is fire, Yellow represents building damage, and Green is areas that experiences liquefaction during the seismic event (The Seattle Post, 2002, and the City of Kobe, 2005).

Background Information

History

The damage from the earthquake was extensive reaching across all sectors of society, halting business and normality of the citizens' life. Wooden homes constructed after WWII accounted for 87% of the destroyed homes in the 1995 Hanshin-Awaji Earthquake. The Port facilities were inoperable as well as the roads to the ports were inaccessible. The traffic routes were affected by collapsing of the expressway, sinking ground, cracks, and collapsed buildings. The now displaced citizens of Kobe had to live in shelters, with 599 shelters operating the month of the disaster, and 236,899 people using these shelters. Public facilities were lost as well as hospitals.⁷

⁶ Kobe City Restoration Plan, Kobe City Government, June 1995.

⁷ The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

	Higashi Nada	Nada	Chuo	Hyogo	Nagata	Suma	Tarumi	Nishi	Kita	Total
Dead	1,470	934	243	556	921	399	26	9	13	4,571
Evacuees (Peak)										
-Shelters	120	74	90	96	79	69	41	16	29	599
-Overnight	60,700	35,000	35,172	26,300	35,347	21,067	6,926	1,777	2,348	222,127
-Daytime	65,859	40,394	39,090	26,300	55,641	21,728	4,747	1,787	2,360	236,899

	Higashi Nada	Nada	Chuo	Hyogo	Nagata	Suma	Tarumi	Nishi	Kita	Total
Collapsed										
Fully *	13,687	12,757	6,344	9,533	15,521	7,696	1,176	436	271	67,421
Half ♦	5,538	5,675	6,641	8,109	8,282	5,608	8,890	3,262	3,140	55,145
Burned										
Fully	327	465	65	940	4,759	407	1	0	1	6,965
Partially	22	2	17	15	13	9	2	0	0	80
Half	19	94	22	46	61	20	5	1	2	270
Small fires	2	0	8	52	1	6	1	1	0	71

* Fully Collapsed - buildings whose damage to principal supporting structures (walls, pillars, beams, roof, stairs) amounts to more than 50% of the current value of the building

♦ Half Collapsed - buildings whose damage to principal supporting structures (walls, pillars, beams, roof, stairs) amounts to between 20 - 50% of the current value of the building

Table 1. Approximate amount of damage after the earthquake in each division of Kobe.⁸



Figure 3a. Highway in National Artery Road No.43 at Iwaya after the 1995 earthquake, 1996, and 2005.



Figure 3b. Rokko Island Marine Park in 1995, 1996, and 2006. Notice the shipping port growth in the background.⁹

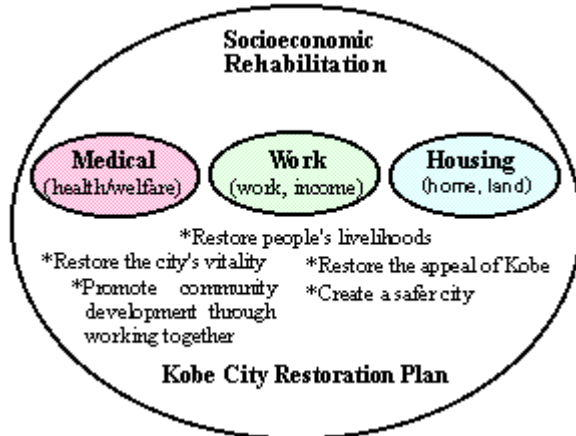
⁸ The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

⁹ City of Kobe. www.city.kobe.jp

Significance

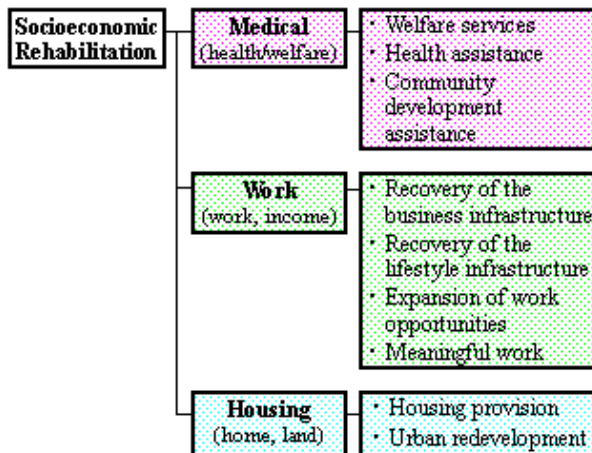
The result of the earthquake was quite devastating. The City of Kobe had 67,421 structures fully collapsed and 6,965 structures were destroyed by fire caused by breaks in the gas lines. Power went out citywide and water was unavailable nearly citywide. Gas had 80% failure and there was 25% failure for telephones. The sewage, which originally relied on seven facilities, was reduced to six, with two of those at reduced capacity. There were 599 evacuation shelters for 222,127 evacuees.¹⁰

The Kobe City Restoration Plan is multi-goal plans with the main issues to be addressed generalized due to their lengthy detail.



- Restore “Citizens’ Livelihood” by:
- 1. Providing high quality (safer) public and private housing and housing support,
 2. Develop a living environment to match the local area’s character by land improvement.
 3. Upgrading health/medical care and welfare services such as counseling, create job

opportunities, upgrade the public health centers, establish a system that can provide support in the case of another natural disaster, new welfare, and the reinforcement of the cooperation between the public centers, medical facilities, and welfare offices.



4. Preparing a nurturing environment for the children by first restoring the schools, incorporating disaster prevention education, make schools the core of the community, and create a society that protects consumers’ interests.
- Restore the “Vitality of the City” by first supporting small to medium sized businesses and promoting industry. Also the Port of Kobe will be restored within

two years with the plan to evolve the port into a leading global competitor. Develop Transportation Networks by rebuilding the roads and improving the transportation network.

¹⁰ City of Kobe. www.city.kobe.jp/cityoffice

- Restore the “Appeal of Kobe” by first leading ad campaigns to advertise Kobe’s restoration, promote cultural activities, and sports for the citizens. Create an international city with the goal to make the foreign residents feel more comfortable. This also includes creating a communication-oriented community with readily available and easily assessable information systems, and creating an environmentally friendly city abundant with water and green spaces.
- Promote “Community Creation” by “Working Together.” This incorporates creating a people-first community with cooperation as well as the city government acting closely. The plan is to create a unique and attractive community by working together, promoting creative volunteer activities, and constructive community-based activities with businesses.¹¹

Sound Practice Details

To deal with a catastrophe of this magnitude the recovery plan has many steps to reach completion depending on the immediate necessity. The first and most urgent need in this situation was to provide large numbers of housing for the population without homes, restore the schools, and rebuild the necessary roads.

Infrastructure improvement for roads, harbor facilities, railways, and airports were achieved and improved for unloading and securing emergency goods, as well as creating a base fire transportation network. An emergency transportation network was planned and implemented. The Port of Kobe was restored and seismic reinforcement was included. By 1997 it was able to handle 90% of normal freight frequency. Still to be implemented is a grid-type standard highway and the completion of the Port of Kobe.

After the failure of the cities utilities, an improved system was needed to ensure the likelihood to occur again in another earthquake scenario. All utilities were restored within three months by aid organizations and teams. In the implementation of seismic resistant structures were implemented as an upgrade for a more disaster resistant hardware system. The progress is controlled by the city budget and is still under the process of completion. The completion depends on the limited budget throughout the years to come.¹²

Lessons learned from the Great Hanshin-Awaji Earthquake have in turn enhanced Japan’s disaster risk reduction legislation and government policy. In Japan the disaster management legislation is geared towards a large-scale ocean-trench earthquake that would have a wide range of effects.¹³

¹¹ Kobe City Restoration Plan, June 1995, Kobe City Government.

¹² The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

¹³ Government of Japan, National Report of Japan on Disaster Reduction for the World Conference on Disaster Reduction, Kobe-Hyogo, Japan, 18-22 January 2005, UN-ISDR.

Building codes in Japan are only for large structures and have no seismic code for private homes. After the collapse of homes, which contributed to the high death toll, promotion of earthquake-proof houses and buildings was addressed. The Hyogo Prefectural Government has provided subsidies for seismic diagnosis to 39,000 homes since 1996 for private seismic retrofitting of private homes. Older homes are given priority to become earthquake resistant. Schools, beginning in 2004, are in the process of being retrofitted.

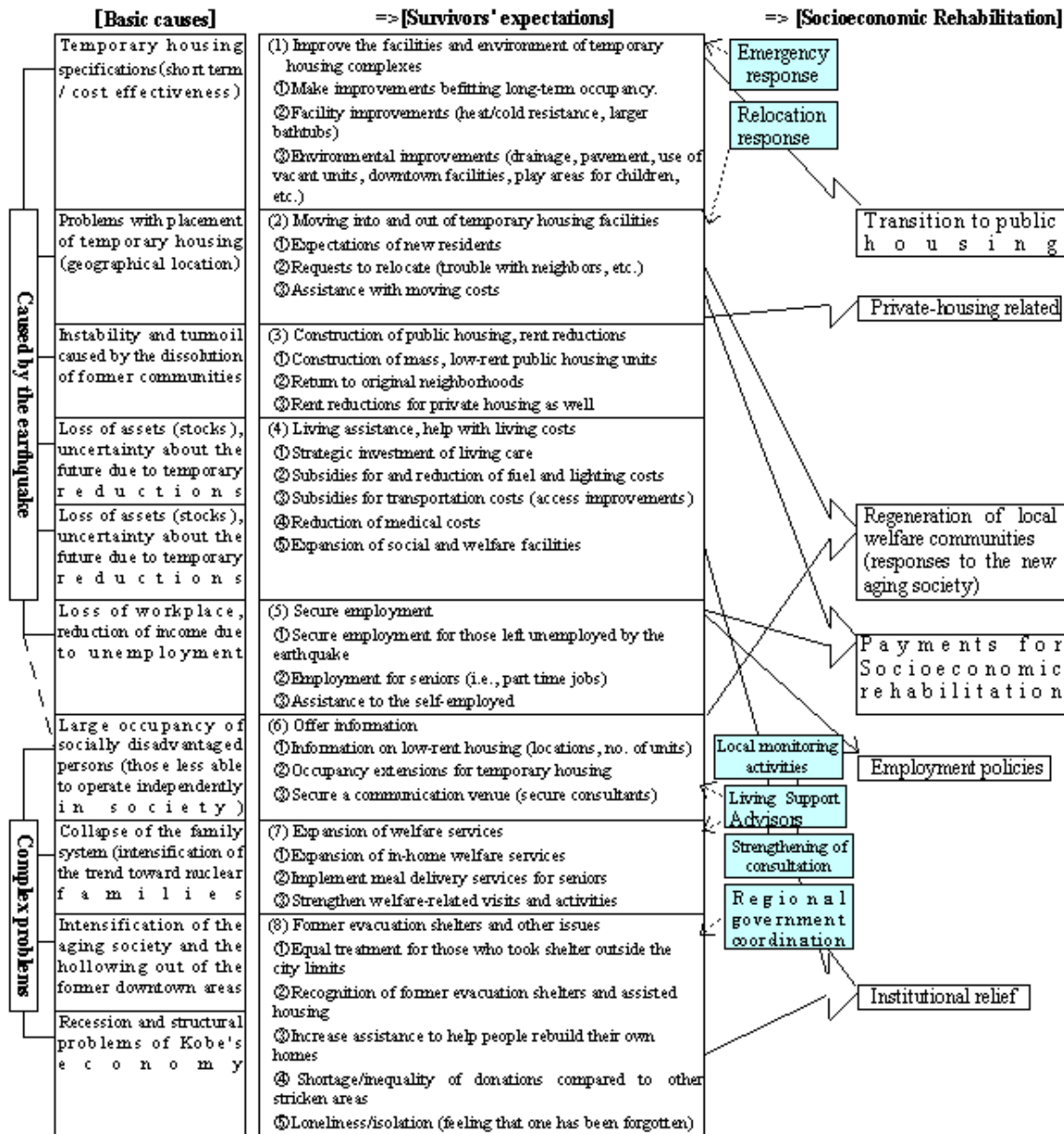


Figure 4. Problems inflicted by the earthquake onto the citizens and what the people of Kobe expect to help them regain normality.¹⁴

¹⁴ Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake. www.city.kobe.jp

The Kobe City Restoration Plan is made up of many micro-projects that range from infrastructure to social needs. The project includes many micro-projects directed at children, the elderly, counseling, creating citizen based communities among many others. Listed are a few examples taken from a long list of projects that demonstrate the array of micro projects.

Parks and Water ways:

In Urban districts park improvement and development of more green spaces was a lesson learned. “Project for Environmental Improvement of Disaster Reduction Parks” was established by local communities to reflect the characteristic of that district. This is still being developed. Along with this is the preservation of a natural environment. This environment also provides pure water as well as a place for healing.

Support for Children:

Children affected by the disaster were provided emotional support. In February 1995 a workshop was held to better understand the emotional state of children as they cope with the disaster. Teachers specializing in educational reconstruction were assigned to affected schools to provide this emotional support. Also, counseling training was provided to all teachers in all school levels to help reach a large number of children.

Health and Welfare:

The Health and Welfare plan is the development of an elder watch system. Special housing and care givers were provided and built to ensure the safety of elderly victims and these assistants are able to respond in case of a future emergency situation. These programs also help the independently living elderly and help create a community by arranging social projects and establishing neighborhood associations. This program is planned to be taken another step. Elderly residents and the diversity of lifestyle needs need to be met.¹⁵

Economic and Job Creation:

The earthquake caused such a disruption of everyday life, which left families homeless and workplaces in ruin. This micro-plan is to boost employment opportunities by applying diversified business models. The first step was to give these individuals a temporary cost-of-living support. The government, labor unions, and businesses cooperated created the “Agreement on Hyogo-style Work-sharing.” Post war baby boomers were encouraged to still participate in the work force due to their skills.¹⁶

Creating a Disaster-Safe City:

This plan is translated into steps that deal both with social home and business environment, constructing disaster – resistant infrastructure, and being well prepared in case of a future event. The Plan is divided into three zones, from the smallest local level to a city level.

1. Neighborhood zone is controlled by the residents where it is up to them to create a community and incorporate the schools, parks, and other institutions. In a non-social sense they are responsible for disaster prevention, facilities, and supplies

¹⁵ The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

¹⁶ The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

- for disaster events, rearrange parks and roads for safer and more comfortable communities, and have community specialists who create databases for a disaster-resistant community.
2. The Everyday Life Zone connects the neighborhood zones and gives aid and disaster prevention support for operations. The interactive infrastructure is to help link citizens with the municipality, leader training, and coordinate regional activities, aid in neighborhood zoning plans, prepare private back-up supplies in the case that a natural disaster may occur, and share disaster-resilient neighborhood databases within the city area.
 3. The Ward Zone encompasses a large amount of area with no social planning and more Disaster Risk management based. The Plan is to help ward zones respond to disasters and carry out disaster preventive operations smoothly, and improve the ward offices to serve as independent general disaster prevention bases. This level also has the tasks of creating disaster prevention plans for city wards, relaying information amongst the disaster prevention databases, and securing facilities to be able to function independently.¹⁷

To verify that each plan was carried out six panels were created, with each addressing a different issue to verify; Health and Welfare, Society and Culture, Industry and Employment, Disaster Reduction, and Urban Development and Community Building.¹⁸ They were to ensure that the master plan promotes rapid regrowth of Kobe and stresses the improvement of Kobe for its citizens and industrial future.

Category

This is a comprehensive sound practice that deals with different categories, it can be said that it tries to address all of them: legal, political, organization-managerial, technical, land-use management and instructional.

Sponsors

Government assistance is given to local leadership for the reconstruction plans of local entities. The government is to support the implementation of local authority reconstruction plans with the intention of providing the greatest extent outlined in the meeting that occurred in the government's Great Hanshin-Awaji Earthquake Reconstruction Headquarters as the Policy on Efforts to support the reconstruction of the Hanshin-Awaji area. This also required a second supplementary budget for the fiscal year of 1999, with a total of 5.02 trillion yen in budgetary allocations to be implemented.¹⁹

The Hyogo Phoenix Plan enables the distribution of reconstruction loans and Great Hanshin-Awaji Earthquake reconstruction grants to the Hyogo Prefectural Government, Kobe Municipal Government. Under the Disaster Countermeasures Basic Act, the local

¹⁷ Kobe City Restoration Plan, June 1995, Kobe City Government.

¹⁸ The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

¹⁹ City of Kobe. www.city.kobe.jp

public bodies are required to set aside a disaster countermeasure fund of a specific amount of money to cover emergency expenditure as under the Disaster Relief Law.²⁰

The Great Hanshin-Awaji Earthquake Reconstruction Foundation and Promotion of Expedient measures for reconstruction were established. A fund totaling 900 billion yen was set April 1995 to be used over the period of 10 years for projects. This money was available in the form of:

- Livelihood Restoration Fund loans and interest support for the funding of rebuilding and purchasing of homes
- Rent reduction subsidies for residents of private rented housing
- Assistance for voluntary activities
- Assistance for events to revitalize shopping arcades and community businesses
- Assistance for reconstruction and community-building
- Interest support, for example, for funding housing reconstruction in areas designated for Restoration and the Urban Environmental Improvement Project²¹

Victims were assisted by donations, petty cash loans, Disaster Relief Fund loan system, socioeconomic Reconstruction Fund loan system, and Victims Self-Help Assistance Fund system.²²

(amounts in Yen)

	Hyogo Prefecture	Kobe City	Total
Basic Fund	13.33 billion	6.67 billion	20 billion
Working Fund (long term loan)	586.67 billion	293.33 billion	880 billion
Total	600 billion	300 billion	900 billion

*The reimbursement of 580.00 billion yen will be completed on December 12, 2005. The remaining 300.00 billion yen is scheduled to be reimbursed on March 27, 2006.

Table 2. Basic distribution of funds allotted for rebuilding Kobe.²³

²⁰ Government of Japan, National Report of Japan on Disaster Reduction for the World Conference on Disaster Reduction, Kobe-Hyogo, Japan, 18-22 January 2005, UN-ISDR.

²¹ The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

²² The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

²³ The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

As of Feb. 29, 2000 (*unit: million yen)

Item	Description	Payment unit (yen)	Number of payments	Total payments*	Notes
First donation disbursement * Donation Collection Committee Total planned: 45.52 billion yen	Fully destroyed/burned building condolence funds	100,000	117,056	11,705,600	
	Half destroyed/burned building condolence funds	100,000	121,783	12,178,300	
	Condolence funds for dead or missing persons	100,000	3,664	366,400	
	(1) Subtotal	=300,000	242,503	24,250,300	
Second donation disbursement * Donation Collection Committee Total planned: 77.71 billion yen	Condolence funds for the seriously injured	50,000	6,575	328,750	
	Support for needy households	300,000	28,239	8,471,700	
	Education funds for affected children and students	10,000-50,000	19,337	614,980	
	Special education funds for orphans	1,000,000	283	283,000	
	Housing assistance grants	300,000	104,334	31,250,576	
	(2) Subtotal	=1,400,000	158,768	40,949,006	
Third donation disbursement * Donation Collection Committee Total planned: 55.44 billion yen	Socioeconomic aid	100,000	198,894	19,889,400	
	Additional socioeconomic aid	50,000	(198,607)	9,930,350	
	(3) Subtotal	=150,000	198,894	29,819,750	
Total donations (all planned for disbursement): 178.67 billion yen	(1)+(2)+(3) Total	=1,850,000	600,165	95,019,056	
Total (Report of Donation Collection Committee: as of Jan. 31, 2000): 1,792.6 hundred million yen					

Hanshin-Awaji Earthquake Restoration Fund Projects	Independence Aid for EQ Victims		375-1.5 million yen	88,362	86,636,020*
	Breakdown	Socioeconomic Rehabilitation Aid for Elderly Earthquake Victims	15-25,000 yen	27,072	9,117,985*
		Financial Aid for Middle-Aged/Senior Earthquake Victims to Obtain Permanent Housing	15-20,000 yen	12,224	2,689,055*

Item	Description	Payment unit (yen)	Number of payments	Total payments*	Notes
City of Kobe Disaster Condolence Funds and Hyogo Prefecture Disaster Aid	Fully destroyed/burned building condolence funds	140,000	121,540	17,015,600	
	Half destroyed/burned building condolence funds	70,000	120,258	8,418,160	
	Condolence funds for the seriously injured	22,000	6,618	145,596	
	Death (excludes those eligible for bereavement)	140,000	148	20,720	

	funds)				
	Total		248,564	25,600,076	
Bereavement funds	Primary wage earner	5,000,000	895	4,475,000	
	Others	2,500,000	3,148	7,870,000	
	(Disaster disability ->death)	1250,000	4	5,000	
	Total		4,047	12,350,000	
Disaster disability condolence funds	Primary wage earner	2,500,000	13	32,500	
	Others	1,250,000	29	36,250	
	Total	3,750,000	42	68,750	
Disaster assistance loan	First disbursement	Limit	21,874	52,595,100	fixed
	Second loan disbursement	15,000-1.25 million	10,456	25,097,100	fixed
	Total		32,330	77,692,200	
	Amount repaid (as of 2/29/00)		A total of 3,592	7,241,452	
Special loan for living expenses(Kobe City Council of Social Welfare project)	Special loan for living and welfare	100,000 or 200,000	44,514	6,586,870	
Living and welfare funds Disaster aid loans (Kobe City Council of Social Welfare project)	First disbursement	Limit	284	277,160	fixed
	Second disbursement	1,500,000	124	123,960	fixed
	Total	=	408	401,120	
Special loans for living expenses (Kobe City Council of Social Welfare project)	Living and welfare funds. Loan for moving expenses	Limit 500,000	2,865	1,278,910	
Hyogo Prefecture Socioeconomic Restoration Loan	Issuance of confirmation certificate	Issuance requests: 34,437 Number issued: 34,437		=	

Table 3. Detailed description of money invested in Kobe after the earthquake.²⁴

²⁴ Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake. www.city.kobe.jp

Key Players and Their Roles

The plan allows for the citizens of small communities to make decisions and employ efforts, making them a key player. The government's role, other than aiding in the obvious disaster recovery, is funding for the proper rebuilding of homes as well as rebuilding the city's infrastructure, aiding small and large businesses in recovery, and rebuilding the Port of Kobe. Jobs created by funding destroyed businesses also aids at the employment level, as well as providing jobs and money to the city residents.

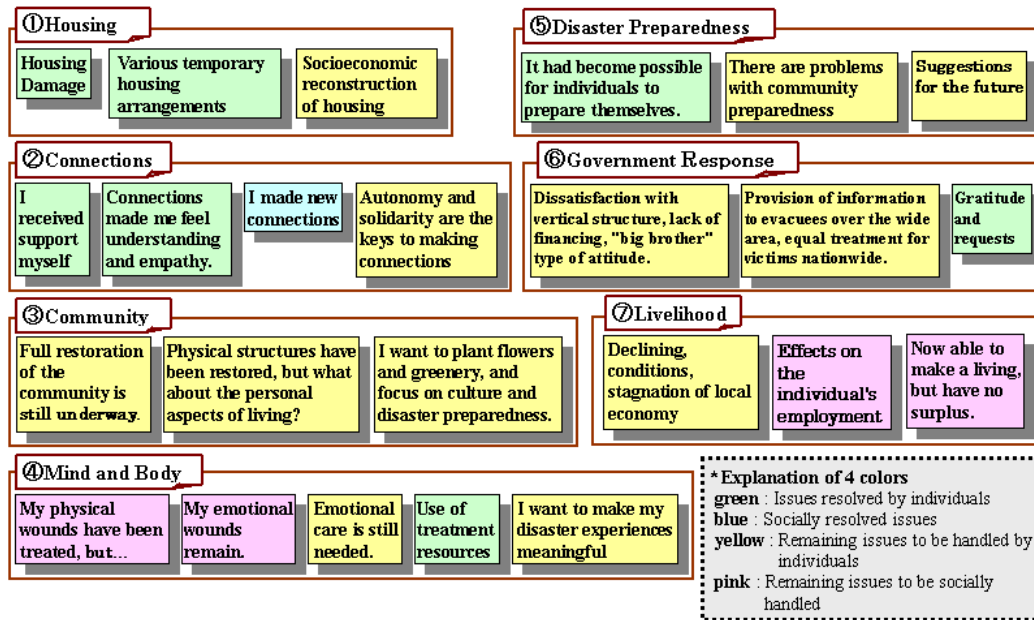


Figure 5. General outline of the multiple range of tasks covered in the Kobe Restoration Plan and progress status of each sub-plan. Blue and Green boxes indicate completion. Yellow and Pink boxes indicate aspects still in the process of completion.²⁵

Target Groups/Recipients

The plan targets the City of Kobe as a whole targeting social and economic aspects. There is special emphasis on helping the children, elderly, small businesses, and large industries.

Locations

The City of Kobe was subdivided into smaller areas to more easily address all the challenges presented by the aftermath. The basic idea is to begin with community reconstruction by starting with local peoples efforts at home and building their way up. This aids to first help achieve normality within a small

²⁵ Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake. www.city.kobe.jp

environment, than begin branching out. This also helps with micro management to contribute to the larger scale reconstruction plan.

Resources to Develop and Maintain

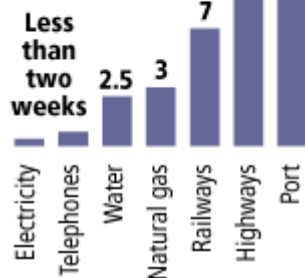
Education of Earthquake Disaster:

The Great Hanshin-Awaji Memorial Disaster Reduction and Human Renovation Institution (DRI) were established to share and pass down the experience and lessons learned to future generations. This is to contribute globally to impact disaster reduction. The DRI exhibits and preserves materials related to the Great Hanshin-Awaji Earthquake, provides research and study, and human resource development.²⁶

RESTORATION TIME FRAME

While power and telecommunications were restored within a few weeks, the Port of Kobe required over two years to complete repairs.

Time, in months, to re-establish services:



Start and Completion Dates

The start date began right after the disaster caused by the January 1995 earthquake. The scale of devastation called for some necessary immediate actions followed by acting on what was most relevant. Within the first month an evacuation shelter was opened, construction of emergency housing began, payment of damage compensation, and Issuance of Victims Identification Certificates were given out. Within the next year a three year plan was implemented towards housing restoration, establishment of the restoration fund, and issues concerning Living Assistance and Social Class.²⁷ A long term reconstruction plan which included improvements for the city of Kobe was a ten year plan, to be reassessed in January 2005.

The original Kobe City Restoration Plan is long and

detailed, discussing every needed approach. All that was intended to be completed was partially or still being completed, depending on the necessity. The 10 year follow up details what was completed, to what extent, what still needs to be completed, and what is the new proposal to complete all the new tasks.

Figure 6. Amount of time, in months, taken for Kobe to repair the vital infrastructure and transportation (The Seattle Post, 2002, and the City of Kobe, 2005).

²⁶ The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

²⁷ Overview of Kobe. www.city.kobe.jp/cityoffice

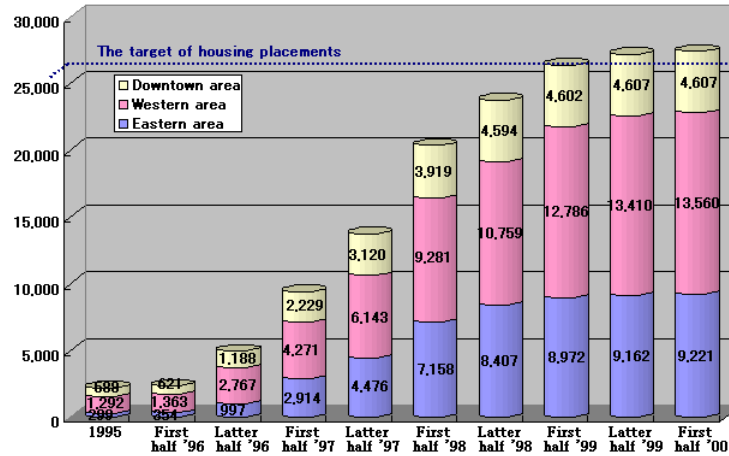


Figure 7. Housing development plan over the span of 5 years. Does not represent the actual amount of homes re-built over this span of time.²⁸

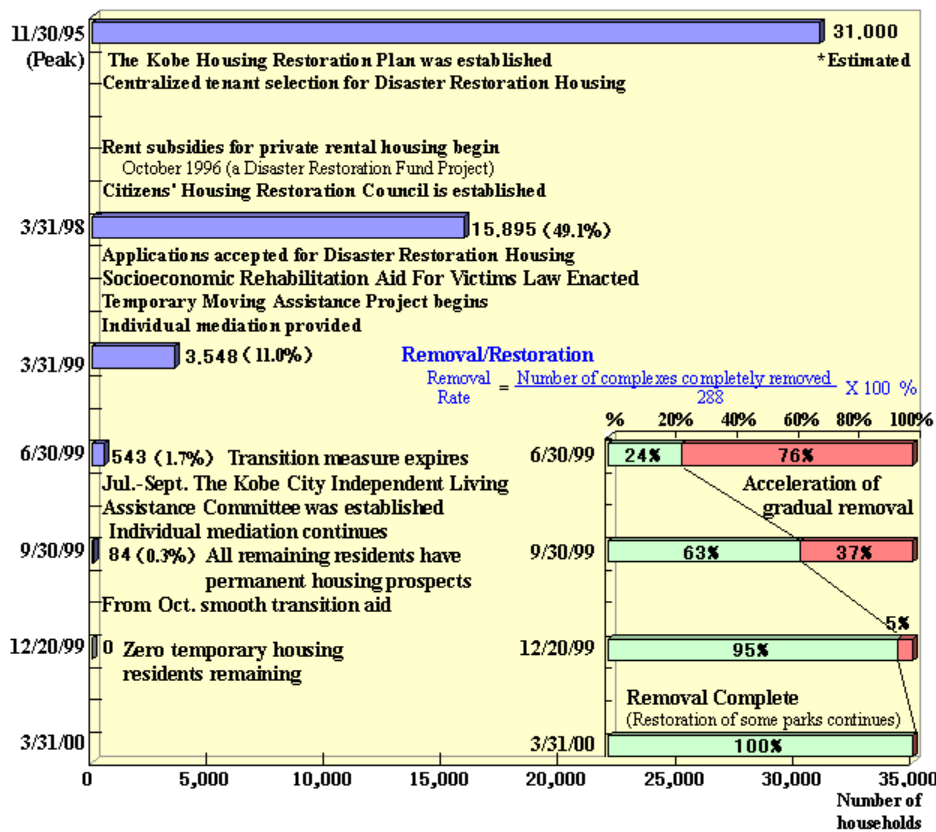


Figure 8. Actual results dealing with housing and land use of Ten-Year Plan over a 5-year scale. The y-axis is a time line showing the decreasing number of temporary housing. The smaller graph shows the increase over time of the restoration progress made.²⁹

²⁸ Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake. www.city.kobe.jp

²⁹ Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake. www.city.kobe.jp

Railway/Bus Lines	Fully Restored
JR Sanyo Shinkansen	8/4/95
JR Tokaido and Sanyo lines	1/4/95
Hankyu Railway	12/6/95
Sanyo Railway	18/6/95
Kobe Railway	22/6/95
Hanshin Railway	26/6/95
Hokushin Railway	18/1/95
Kobe Municipal Subway	16/2/95
All stations reopened	31/3/95
Kobe Rapid Transit	13/8/95
Daikai Station	17/1/96
Portliner	31/7/95
Rokkoliner	23/8/95
Municipal bus: Operation resumed on all 73 routes	22/6/95
Railway substitute bus: Carried 220,000 people a day at the peak.	
Kobe Municipal Subway – Kaigan Line	(opened) 7/7/01

Table 4a. Final completion dates of the transportation systems.³⁰

Hanshin Expressway	Fully Restored
	9/30/96
#3 Kobe Line (Mukogawa-Tsukimiyama)	3/9/96
Maya Ramp-Kyobashi Ramp section	19/2/96
Yanagihara Ramp-Kyobashi Ramp section	17/7/96
Maya Ramp-Fukae Ramp section	10/8/96
Tsukimiyama Ramp-Yanagihara Ramp section	31/8/96
Fukae Ramp-Mukogawa Ramp section	30/9/96
#5 Osaka Bay Route (reopened to Rokko Island 1/7/95)	1/9/95
Roads/Bridges	Date of Restoration
Harbor Highway (in its entirety)	24/8/96
Rokko Island-Takane section	28/9/95
Takaha-Maya section	1/11/95
Kobe Ohashi Bridge section	4/8/95
Port Island-Maya section	24/8/95
Kobe Ohashi Bridge, all 4 lanes restored	4/7/96
Maya Ohashi Bridge	1/8/95
Rokko Ohashi Bridge	28/9/95
Hamate Bypass: 1 lane in each direction restored 5/2/96	4/7/96
Regular roads: Emergency restoration of main roads (excluding where bridges or overpasses had collapsed) * Restoration almost fully completed in 1996.	23/1/95
Route 28 (Daikai Station restoration)	end of 1995
Kobe-Akashi line (Nishidai overhead bridge)	reopened 16/6/97

Table 4b. Final completion dates of the transportation systems.³¹

³⁰ The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

³¹ The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

Relevance to Megacities

This recovery project covered a large scope of issues, but as in the case of the magnitude of the disaster this is appropriate, however in other large cities, the recovery usually does not support its citizens with such well-rounded support. If other megacities have similar funding support as Kobe, this is a well-rounded model of how to deal with post disaster reconstruction. Not only does it deal with the basics such as home, transportation, and infrastructure regrowth, but it adds many other aspects of much needed support, such as for residential and small business, sociological treatment for it's citizens after dealing with such an event, and realization of how the city as a whole was effected largely by the disaster and taking action to reduce this risk in the future, such as elderly care programs. The most significant part was the ability to take this situation and afterwards place a plan of action to improve the city for its residents as well as for future disaster prevention. This scope is from the industry aspect, safety, to residential way of life.

The general lessons learned from the Great Hanshin-Awaji Earthquake to be applied to future earthquake scenarios were:

- Separate plans for each type of disaster
- Revisions of time-priority of response elements
- Clearer responsibilities of the state, local public bodies and residents
- Clarify the role of the public activities of voluntary disaster risk reduction groups
- Changes to accommodate recent changes to the structure of Japan's society and economy
- Accident countermeasures were reinforced.³²

In a bigger picture, lessons learned from this to be applied worldwide, as stated in the World Conference on Disaster Reduction (Lessons from the Great Hanshin-Awaji Earthquake, 18-22 January 2005, Kobe, Hyogo, Japan) is to pass the knowledge learned from this tragic event to future generations. The main focus is the citizens' effort and preparation beginning at the lowest level versus being dependant on the government. Communities and families need to protect themselves, make disaster preparations, create their own towns and communities, and cooperate so that when a large disaster happens they can be prepared, have a community safe-place, and good connections between people as they rebuild.

UNIVERSALITY/TRANSFERABILITY-Due to the amount of devastation a large scale seismic event can generate this plan is highly transferable to any other megacity in proximity to a major fault or plate boundary. Even if a megacity does not use this plan as an example for disaster risk management, it could be of great assistance as an outline that city planners can look over immediately after a large seismic event that has devastated a large urban area to help with the speed, effectiveness, and scope of recovery.

APPLICABILITY-Depending of the government structure of a megacity, availability of finances, and financial planning sections and multiple micro-plans could be transferred. Do the large scale of this project; it could almost be used as a disaster risk management

³² The Report of the 10-Year Reconstruction Overall Verification and Recommendations, January 2005, the Office of the 10th Year Restoration Committee.

plan reference. A megacity could look into this and see what is important in relation to what can be funded.

EXPANDABILITY-This plan appears covers all grounds and expanding would be in result of updating and realizing which areas of the plan were weak and need improvement. If anything the plan encompasses such a wide range of responsibilities and this scale makes the plan even harder to complete as a whole.

ORIENTATION/FOCUS-The focus of this plan is disaster recovery, helping the citizens regain normality to life, rebuilding the city infrastructure and transportation in response to disaster risk preparation and use in another event, ensuring that buildings and neighborhoods are rebuilt with disaster preparedness in mind, ensuring the sound mental health of the citizens, and using this as a chance to improve the city economically and globally.

ASSIMILATION/INTEGRABILITY-Depending on other megacities needs and the large range of projects encompassed in this plan, any city in a seismic risk zone could use Kobe as an example and this plan for city improvements before a seismic event occurs. Kobe can be used as an example of what needs to be stated on the disaster risk preparedness side as well as producing an effective disaster response for a large seismic event.

IMPACT/EFFECTIVENESS-Kobe had grown, maintained, and improved it's reputation globally by using the earthquake lesson and rebound as an example of strength. They were able to take a tragic situation and rebuilt with the respect of living in a region of seismic natural hazards in mind to rebuild and use this to further promote research and awareness of the vulnerabilities of Kobe and its surrounding areas.

Any megacity in a seismic hazard area could use the outline of this detailed plan for disaster preparations in dealing with improving safer conditions for the citizens prior to the event, the importance of green spaces, the care of the elderly and children, and the city infrastructure. Other megacities could use this plan for preparing for the seismic event response so as to help the citizens of a city deal with not only the destruction and lose of normality of life, but the mental being of the citizens and the opportunity for city improvements.

SUSTAINABLE-Over the time line presented the core issues were addressed and completed. The smaller industrial and neighborhood improvement are still in completion, but these would be expected to come into last place in the time line. The scale of this project and limited funds of a city need to first focus on the core issues, and then work on the lower priority improvement issues. These smaller community based plans are still in completion and in the city government funding plans. They have been extended for another 10 years or so to progressively reach these goals.

MEASURABLE- Due to the large scope of this plan each smaller plan must be measured almost independently. To measure the success, first one must look at the immediate response plan for recovery and how the citizens were helped. Then, the improvements for preparation in order to avoid and prevent as much devastation for the next large earthquake event before it happens must be completed. Finally, the economic growth improvements that was intended for the city of Kobe.

ACHIEVABLE- The plan is achievable, but some parts will take many more years than other pieces of the plan. These slower moving parts are determined by the budget of Kobe.

RELEVANT- This complex plan outline should be kept in mind for any other megacities with high vulnerability to a large seismic event. Even in cities that feel that they have already put into place preventative measures to help ensure the citizens safety. This recovery plan can also be used to develop seismic event disaster preparedness plans.

TIMELY- The development of this plan was timely, as it had to be for a disaster on this large of a scale. Although depending on the citizens of Kobe and their social situation, and as that this event disrupted their lives and gave them great loss, the timeliness depends on the balance of the citizens and what the local and country government can effectively provide.

Reference

City of Kobe, May-July 2006. www.city.kobe.jp

From Disaster to Community Development: The Kobe Experience, January 17, 2003, United Nations Center for Regional Development (UNCRD), Disaster Management Planning Hyogo Office.

The Great Hanshin-Awaji Earthquake: Statistics and Restoration Progress, Jan 2005, City of Kobe.

The Kobe Earthquake: Lessons for Seattle from its Sister City, Intelligencer Staff, The Seattle Post, March 2002.

Kobe City Restoration Plan (abridged version), Kobe City Government, June 1995.
www.city.kobe.jp

Lessons from the Great Hanshin-Awaji Earthquake, World Conference on Disaster Reduction. 18-22 January 2005, Kobe, Hyogo, Japan.
www.dri.ne.jp

National Report of Japan on Disaster Reduction for the World Conference on Disaster Reduction, Kobe-Hyogo, Japan, 18-22 January 2005, Government of Japan, UN-ISDR.

Record of Kobe's Post-Quake Socioeconomic Rehabilitation Five Years after the Great Hanshin-Awaji Earthquake, City of Kobe. www.city.kobe.jp

The Report of the 10-Year Reconstruction: Overall Verification and Recommendations (Summary Edition) January 2005, The Office of the 10th Year Restoration Committee.

Somerville, P., (1995), Kobe Earthquake: An Urban Disaster, Eos, American Geophysical Union, Vol. 76, No. 6, pp. 49-51.

Knowledge Base Coding Reference

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