

Population growth over the past few years has resulted in a densely populated belt area extending from east to west. Photo 2 shows an aerial photograph (taken before the earthquake) of the Higashinada Ward (population density 6,301/sq km; this was also where there was the most extensive collapse of buildings, i.e. the traditional wooden houses). It is easy to see that this is an extensively built-up area with very few open spaces. The only major empty spaces are the school grounds.

Hanshin (Kobe-Osaka) Metropolitan Area is also the site of vital links in Japan's massive transportation system. The Meishin Highway connecting Nagoya and Kobe, the Hanshin Expressway between Osaka and Kobe, the Sanyo Shinkansen (bullet train), National Trunk Roads No. 2 and No. 43 - all of which form vital links between east and west Japan - run through this area. Since Kobe is sandwiched in by the mountains and the bay, these national artery links, the regional trunk roads and commuter train services are all bunched together in a densely populated narrow strip of land.

The City of Kobe is served by the Shinkansen (Bullet Train System), 7 commuter train systems (JR, Hankyu, Hanshin, Sanyo, Kobedentetsu, Kobekosokutetsudo and Hokushinkyuuko), 1 subway system and 1 lightweight commuter rail system. It has 117 train stations, and an average of 1.34 million people use the train every day. A total of 123 km of highways serve Kobe, and an average of 606,000 vehicles travel over these highways daily. Railroads and highways are elevated to allow maximum use of the scarce land for public facilities. These massive transportation systems enable this densely populated city to prosper and the residents to enjoy the quality of life of a modern city.

C. Hanshin (Kobe-Osaka) - People's Awareness

Since Japan is an earthquake-prone country, its citizens are constantly reminded of the potential danger from earthquakes. In 1923, the Great Kanto Earthquake destroyed the Tokyo Metropolitan Area and claimed the lives of 142,807 people. Since then, the Government and people have always been aware of the danger. However, the level of awareness differs from one place to another. Since Kobe has not been directly hit by a strong earthquake over the past 1,500 years, its residents and local government authorities considered that they were in an area of very low earthquake risk. The frequency of seismic activity (including very minor events) in the Hanshin (Kobe-Osaka) area is said to be approximately half that of the Tokyo Metropolitan Area. However, the number of tremors people feel is said to be one-tenth of those in the Tokyo Metropolitan Area. Although they do not usually cause any material damage, these tremors are continual reminders of the potential danger and serve as the best possible warning to make people prepare. The people of Kobe did not have the chance to feel these natural warnings.

The principal natural disasters for which the residents of the Hanshin (Kobe-Osaka) area were prepared were typhoons and subsequent landslides. To withstand the strong winds of typhoons, many traditional houses in the region (two-story wooden structures with tile roofing) were especially built with a layer of mud on top of the wooden roofing base and then heavy ceramic tile on top of that - which made them

神戸市東灘区

地震前



Photo 2 Aerial Photograph of Kobe Higashinada Ward before the Earthquake
8 May 1994 Geographical Survey of Japan

国土地理院 撮影

兵庫県南部地震による被害地域の航空写真 家屋倒壊の著しい神戸市東灘区



1995年1月20日

Photo 3

Aerial Photograph of Kobe Higashinada-Ward after the Earthquake
20 January 1995. Geographical Survey of Japan

very vulnerable to earthquakes. The emergency preparedness plan drawn up by the local governments also focused on typhoons and landslides. The seismic intensity foreseen in local emergency preparedness plans was V on the JMA (Japan Meteorological Agency) Seismicity Scale, which is equivalent to 8-9 on the Modified Mercalli Scale.

D. How People Felt the Seismic Event

At 5:46 a.m. on the morning of 17 January, most people were asleep at home. Family members were together in their home. It was still very dark outside, because sunrise would not occur until 7:03 a.m. People active in town were those delivering newspapers, early risers jogging and workers on night duty. Commuter services had just started the first train of the day. The first daily Shinkansen (Bullet Train) was scheduled for 6:00 a.m. In 30 to 60 minutes, the majority of people would wake up and begin their day.

The residents of Kobe who were in bed suddenly felt a violent upward blow. The next moment, the electricity was cut off due to both power line damage and an automatic protective shutoff. In complete darkness, they were thrown out of bed, furniture was flying around their rooms, and objects were falling from everywhere. In some cases, ceilings and roofs collapsed in on top of them. Because the epicenter was quite near Kobe, and shallow, they did not feel any preceding small tremors but just this sudden, big blow. This did not give them time to take an initial, body-protective action, such as covering their heads with blankets or taking shelter under a solid table, which would have been possible in the first 1-2 seconds if the epicenter had been far away. Some survivors who were interviewed mentioned that they first believed there had been an underground gas explosion. Then they tried to crawl out of bed but, in complete darkness, fallen furniture, TV sets, scattered books, fragments of glass and dishes blocked their way. NHK, the public broadcasting corporation, was able to film the moment of the earthquake in its Kobe Broadcasting Station, where the newscaster on duty was taking a nap in the office. With the initial blow, he tried to wake up and protect his body with blankets but he had great difficulty. Beside him, office cabinets slid back and forth and telephone sets and monitor screens fell down.

Even if their houses sustained no structural damage, many persons were trapped by falling furniture and others were injured by objects flying around in their rooms. Survivors who were not trapped or injured mentioned that it took them up to two hours just to get out of their houses and see what it was like outside. Many survivors tried to put on their TV. However, the TV sets had fallen down and there was no electricity. Radio is the usual source of information in an emergency, but many persons couldn't locate their sets.

At 5:55 a.m. the Japan Meteorological Agency announced that the earthquake epicenter had been on the northern tip of Awaji Island, that the magnitude was 7.2 and that the seismic intensity on the JMA scale was V in Kyoto and IV in Osaka. At 6:13 a.m. JMA announced that the seismic intensity in Kobe was VI. This information was immediately aired over the NHK public broadcasting corporation's TV and radio. However, many Kobe residents were unable to listen to this important information.