

A survey for the effect of 2011 Van earthquakes on elevators

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Preface

This consultancy work includes; a three-day (December 25-27, 2011) investigation of elevators in Ercis, Edremit and the City center of Van, collecting details of buildings, elevators and type of damages, taking photographic evidences, preparing a detailed report on the effect of earthquakes on elevator systems and their susceptibility to earthquakes.

During the three-day survey, the investigation of elevators was performed with the guidance of a local elevator company (Ahtamara Asansör) in Van. Traction elevators visited were randomly chosen for the investigation. Because there were not many hydraulic and MRL elevators in the region, the addresses of hydraulic and MRL elevators had been obtained from servicing firms.

Experts, who joined the survey, were;

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1. Introduction

Van is a province in eastern Turkey, between Lake Van and the Iranian border. It is 19,069 km² in area and had a population of 1,035,418. Its adjacent provinces are Bitlis to the west, Siirt to the southwest, Şırnak and Hakkâri to the south, and Ağrı to the north. The city of Van is on the eastern shore of Lake Van, at an altitude of 5,750 feet.

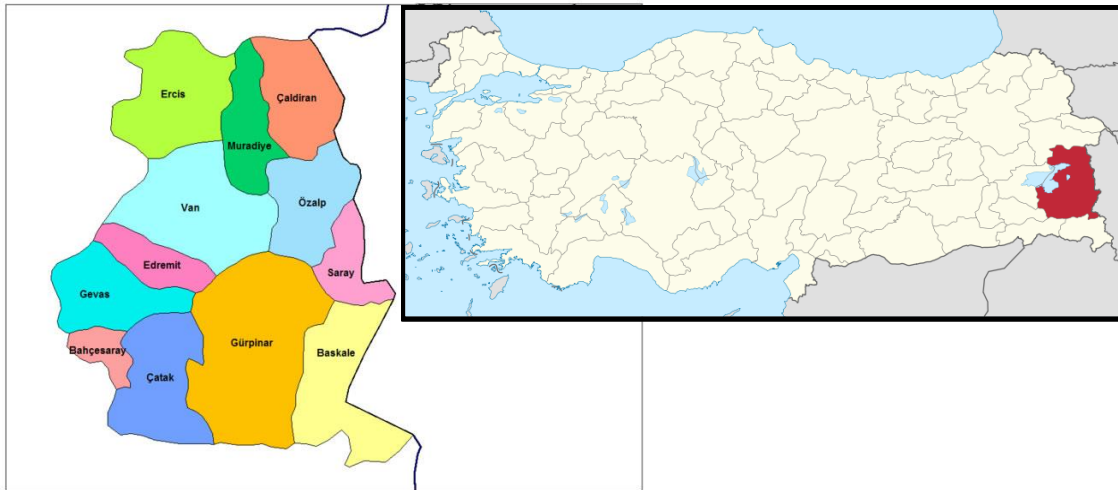


Figure 1. Location of the city Van.

The most well-known and important seismic threat in Turkey is due to the North Anatolian Fault that is shown in Figure 2. It has a long history of damaging earthquakes. Other important faults that are well-known sources of large earthquakes are also shown in Figure 2.

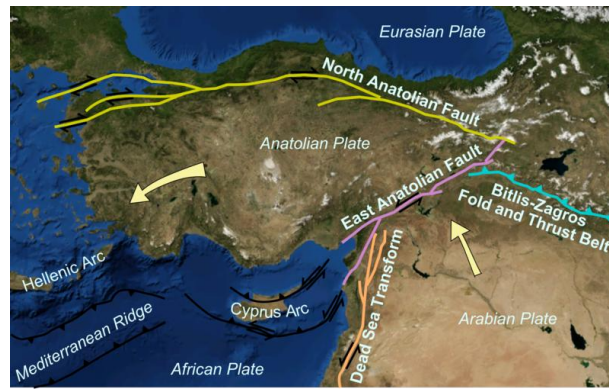


Figure 2.

The earthquake of 23rd October 2011, which was at the magnitude of 7.2 M_w , had a compressional focal mechanism and occurred in a region where three plates intersect: the Arabian and Eurasian plates are crashing into each other, and the Anatolian 'micro-plate' is running away. The earthquake and its aftershocks affected much of eastern Turkey, demolishing hundreds of buildings and burying numerous victims under the rubble.

Erciş a town near Van, had the hardest hit by the violent shaking; at least 55 buildings were destroyed, 45 fatalities, and 156 injuries occurred in the town alone. Most of the buildings that collapsed along the town's main road were residential, raising the number of fatalities. In smaller villages near the epicenter, the shaking demolished almost all the brick houses.

The second earthquake that hit the region was on the 9th November 2011 at the magnitude of 5.6 M_w . It was felt rather strongly by the inhabitants of Van, since the epicenter of the quake was at Edremit, only 16km away from the City center of Van and happened to be very close to the surface. It also caused comparable damages to the buildings.

2. Van Earthquake

2.1 Van Earthquake on 23 October 2011

The first Van earthquake was at a destructive magnitude of 7.2 M_w that struck eastern Turkey near the city of Van on 23 October 2011. The village of Tabanlı was the epicenter of the earthquake that cost the lives of 220 people while 1090 people were counted to have been wounded. In addition, the city Van is told to have suffered massive material damage. It occurred at a shallow depth of 20 kilometers, causing heavy shaking across much of eastern Turkey and lighter tremors across neighboring parts of the South Caucasus and Levant.

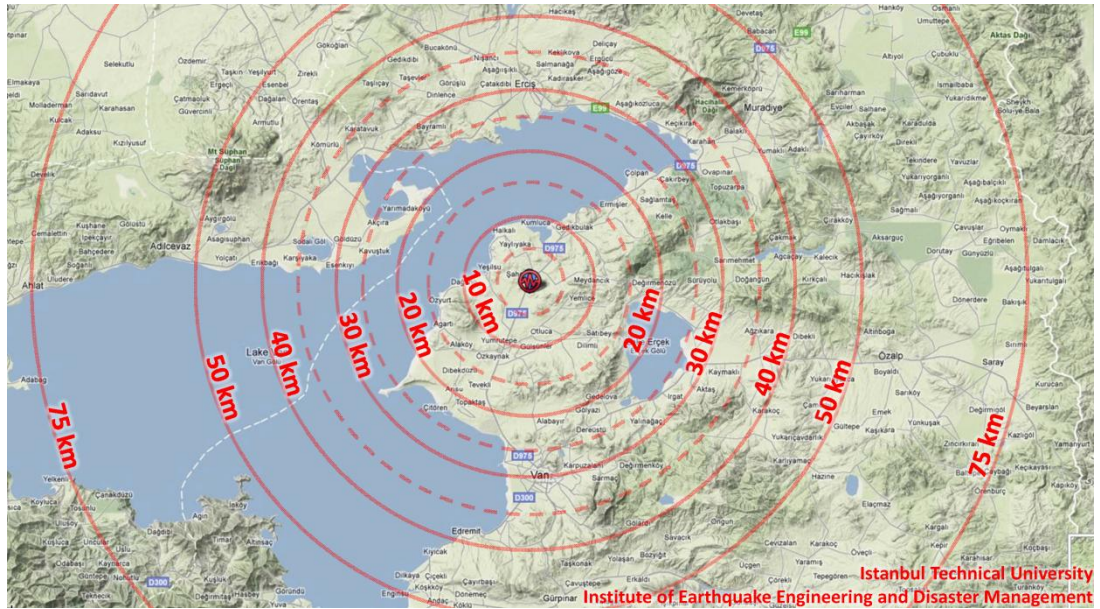


Figure 3. Villige of Tabanlı, location of the earthquake on the 23rd October 2011.

Kandilli Observatory and Earthquake Research Center (KOERC) in Boğaziçi University recorded two after-shocks in İlkaynak and Gedikbulak villages, of respective magnitudes of 5.4 and 5.5, and also informed that thousands of other after-shocks were recorded in the region of Van. In Figure 3 the location of the October 23 earthquake is shown.

There were 1561 aftershocks above the magnitude of 2 M_w as of October 30th 2011. The highest magnitude aftershock came on October 23rd, with a M_l 5.7 and M_w 6.0. According to National Earthquake Monitoring Center's data, the number of aftershocks reported in ranges are shown in Table 1 below;

Magnitude M_w	Number of aftershocks
2 to 3	556
3 to 4	832
4 to 5	108
5 to 6	7

Table 1. Magnetite and number of aftershocks between 23rd and 30th October 2011.

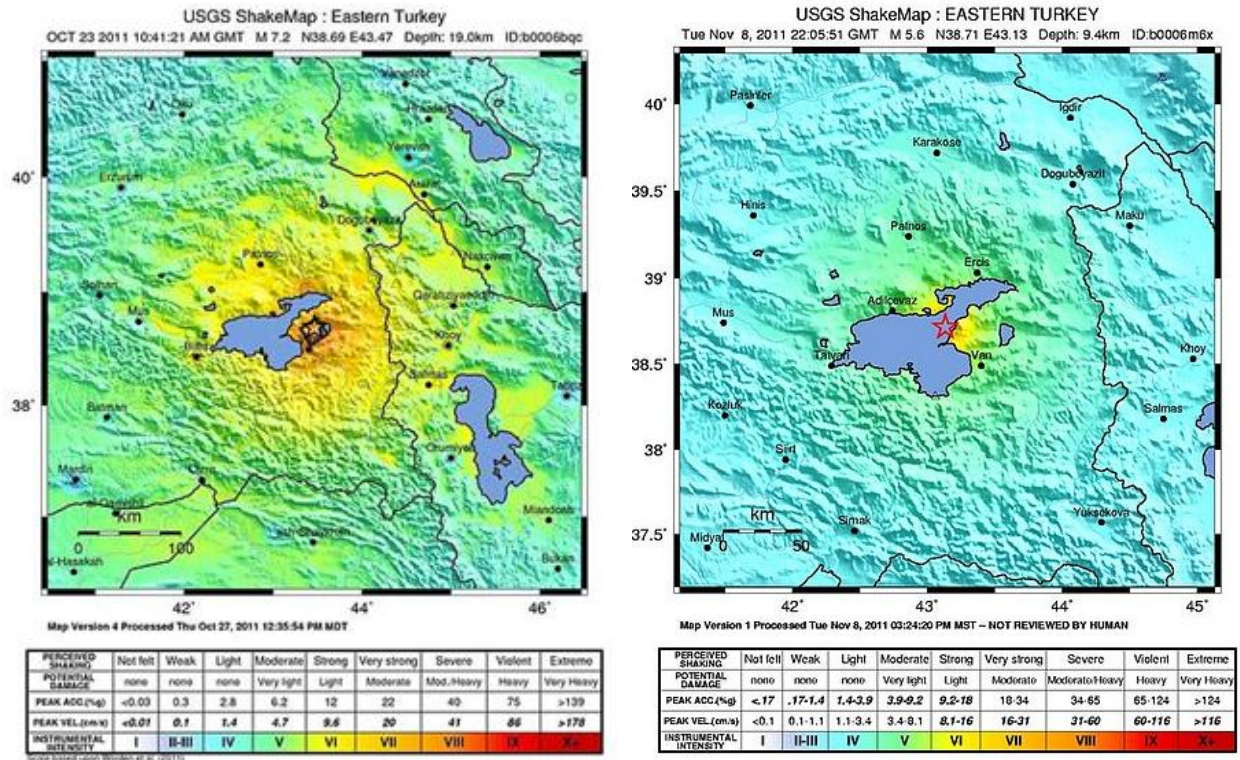


Figure 4. Source: Kocyigit et al.

2.2 Van Earthquake on 9 November 2011

Another earthquake with the magnitude of 5.6 M_w and a depth of 9.4 kilometers hit near Van on 9th November 2011, causing 40 deaths and hundreds injured. It was centered 16 kilometers south of Van (Figure 4). Among the buildings collapsed by the 9th November earthquake was Bayram Hotel, which hosted some journalists and rescue workers. The earthquake toppled 25 buildings, which were mostly evacuated after the earthquake on 23 October, otherwise the death toll could have been worse.

3. Impact and Damage

The two earthquakes killed 604 and injured 4,152. At least 11,232 buildings sustained damages in the region, 6,017 of which were found to be uninhabitable, leaving at least around 60,000 people homeless. The other 5,215 buildings have been damaged but are habitable.

In the city center of Van, at least 100 people were confirmed dead, and 970 buildings collapsed in and around the city. The natural gas, water, power, and communication systems in Van were all reported affected and in function again within 24 hours after the earthquake.

The death toll was caused primarily from building collapse in urban areas. The district of Erciş is claimed to have turned into a ruin while fortunately, public buildings and hospitals did not suffered any considerable damage.

Below graphs show the structural damages on buildings in Ercis and the city center of Van and also gives information about the building stock of the region.

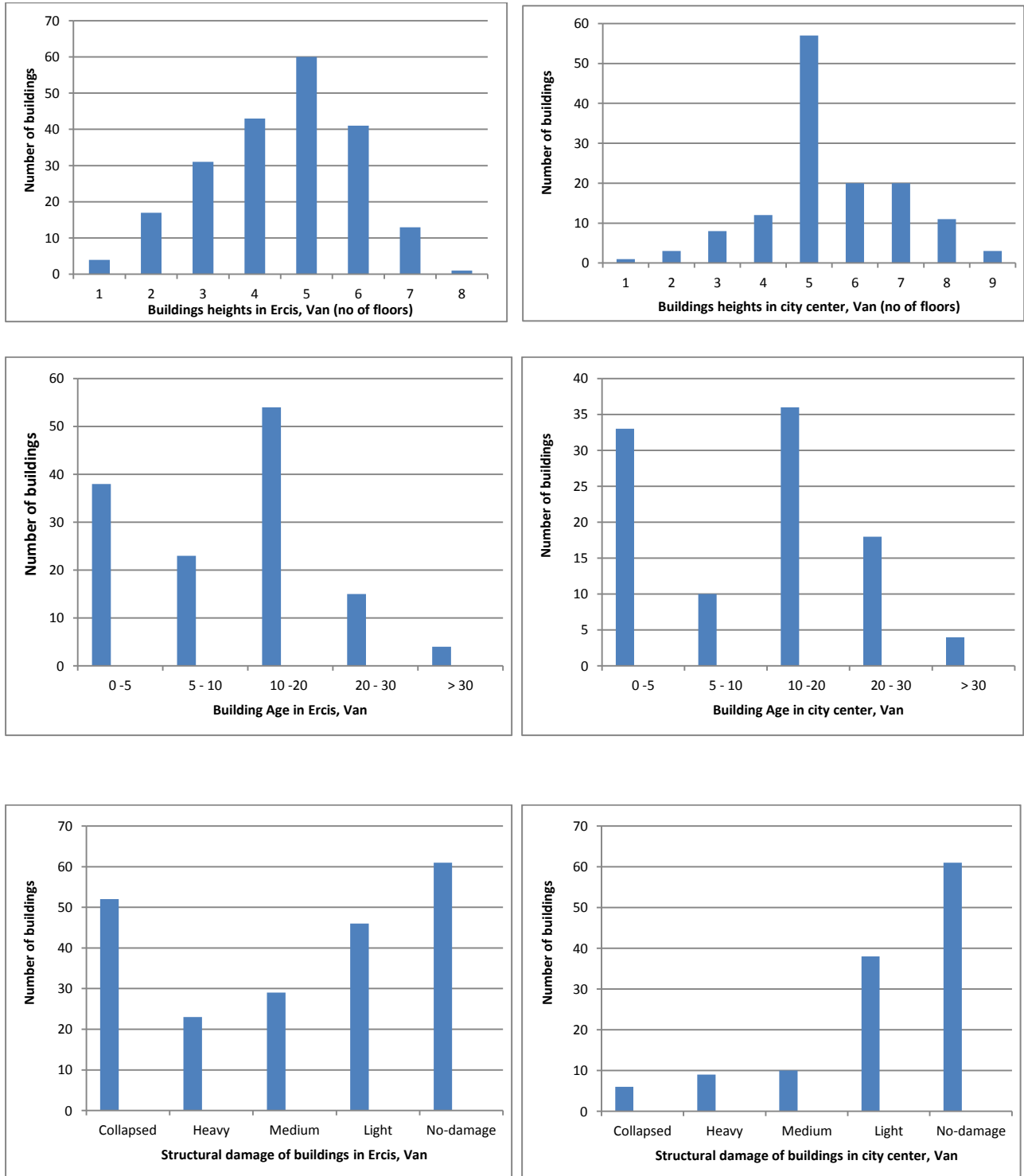


Figure 5. Structural damages according to building stock in Ercis and city center of Van.

4. Current Elevators Status in Van

In Van region majority of the elevators are conventional traction type and there are only very few types of hydraulic and machine-room-less (traction) elevators. In order to have a clear idea about susceptibility of elevator types to seismic shakes, as many as those of different types had been targeted to be checked. Conventional traction elevators were randomly chosen for the investigation and hydraulic and MRL (traction) type elevators were visited at their addresses.

During the elevator survey in Van region, three major locations that were strongly affected by the quakes were selected to examine elevator damages. These are Ercis, Edremit and the City center of Van. Totally 27 elevators were evaluated in the report. Figure 6 shows the distribution by the elevator types and the location.

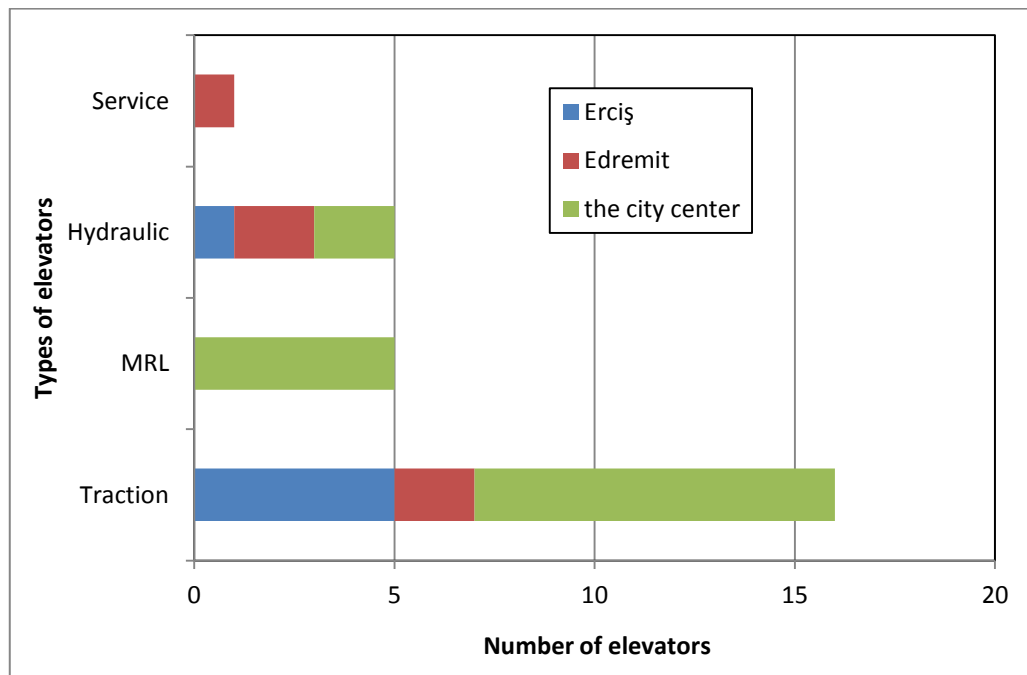


Figure 6. Number of elevators investigated during the survey.

4.1. Elevators in Ercis, Van

In Ercis, Van Yolu Caddesi was the most affected avenue from the earthquake where 4 damaged buildings and their elevators were investigated. Damages that were observed at these elevators were identical. The local servicing firm, Ahtamara Asansör, also stated that majority of elevators were at the same state. To save time other similar buildings were left out. Additionally, a primary school beside the Van Lake was visited and its lift was examined. The details of these investigations are given in Appendix A.

Main results of these investigations are:-

- (a) The landing doors were swing type and they were in operation and good condition.
- (b) Counterweights were above position comparing with cars.
- (c) Most (4 out of 5) counterweights were derailed.
- (d) Traction machines were intact.

- (e) Hauling ropes were lying on the sheaves.
- (f) Some guide shoes of counterweight frames were broken.
- (g) Some guide rails (counterweight side) were twisted
- (h) Exceptional numbers of brackets were bent.

4.2 Elevators in Edremit, Van

In Edremit, 4 elevators with 5 stops were examined at Van Ihtisas Hospital, where only an emergency service elevator was in operation. (two health care elevators, one hydraulic elevator and one dumb waiter were installed). The hydraulic elevator and the dumb waiter had been out-of-service before the earthquakes due to financial problems. The building had 4 stories over the ground level and escaped with slight damages from the quakes. Though the poor installation practice of elevators was observed on these elevators, there weren't serious damages from the shakes. This can obviously be explained with the building being low rise and the structure of the ground that attenuates intensity of shakes. The details of these investigations are given in Appendix B.

Main results of these investigations are:-

- (a) No counterweight derailments.
- (b) The landing doors were center-opened type and some had problems.
- (c) Traction machines were intact.
- (d) Hauling ropes were lying on the sheaves
- (e) Exceptional numbers of brackets were bent.
- (f) No observed damages on the hydraulic elevator.
- (g) Safety gears of hydraulic elevator were engaged.

4.3 Elevators in the city center, Van

After earthquakes the city center was the badly damaged location in Van province. Two hydraulic elevators, five elevators with traction machines and two MRL elevators were investigated. Additionally, one newly opened hospital, which was evacuated, was visited where there were 3 traction machines without machine room (MRL) and 4 elevators with machine room. All the MRL elevators were panoramic type serving 7 floors. The details of these investigations are given in Appendix C.

Main results of these investigations are:-

- (a) The landing doors were center opening type and they were jammed and stuck.
- (b) Traction machines were intact.
- (c) Generally hauling ropes were lying on the sheaves (except No.7)
- (d) Broken ropes in one case (MRL)
- (e) Hauling ropes hanged out at brackets
- (f) Some guide rails (counterweight side) were twisted
- (g) Exceptional numbers of brackets were bent.
- (h) They were totally out-of-service.
- (i) Slices of the counterweight fell on the car.

4.4 Telephone survey

Because of time limit, it was impossible to check all elevators in the region. Therefore a telephone survey with most known local elevator companies in Van region was also conducted to validate our results. Their servicing activities on damaged elevators showed similar findings than that were observed by us. The buildings where repairs were performed by the servicing firms have either no damage or slightly damaged, habitable buildings.

In addition to the visited 25 elevators, attempts to visit two hydraulic elevators have been refused by the authorities for security reasons since they were installed in governmental places (one in Ercis, another in Edremit). They were identical, 3 stops, 630kg capacity elevators with 0.63m/s contract speed. These two elevators have been reported by their servicing firms as non-damaged and in operation after the quakes. They had required only some valve adjustments. These have also been added in Figure 6.

The servicing firms were also asked about mostly encountered damages such as counterweight derailment and broken guide shoes as well as the number of servicing visits so far. Result of this survey is shown in Table 2.

Servicing firm	Percentage counterweight derailment	Percentage broken guide shoes	Average building height	Number of visited elevators
Ahtamara Asansör	85%	75%	5 to 7 stories	170
Panaromik Asansör	90%	80%	6 to 7 stories	32
Kaya Asansör	70%	30%	6 to 7 stories	23
Birsan Asansör	80%	70%	5 to 7 stories	36

Table 2. Mostly encountered damages in percentages given by the well-known elevator servicing firms in the region.

Amongst the most observed hazards, slices of counterweights falling on the car, twisted rails, bent brackets have been mentioned by the servicing firms. Only in 5 cases there were hauling ropes out of its sheaves, which were mostly caused by derailed counterweight under the attempts of using damaged elevators.

There was no record on entrapments after the initial earthquake. This is because entrapments are normally handled by the household people in the region. Though there has been extraordinary number of aftershocks, entrapment is not mentioned as a problem since most buildings in the region have been evacuated due to fear or severe damage.

5. Counterpart Works

5.1 The 1999 Izmit Earthquake near Istanbul

One of the strongest earthquakes of the century that killed about 20,000 people, destroyed about 15,500 buildings, and caused nearly \$10-25 billion in damage occurred in northwestern Turkey at the eastern extension of the Sea of Marmara on August 17, 1999. The earthquake's epicenter was located about 105 kilometers east of Istanbul, an urban center of over 10 million people, near the town of Izmit on the North Anatolian fault as shown in Figure 2. The earthquake measured 7.5 (moment magnitude) on the modified Richter scale. The earthquake was followed by hundreds of aftershocks.



Figure 7. Earthquakes near Istanbul in 1999

The investigation of earthquakes on the North Anatolian fault system in the Marmara Sea during the past 500 years indicates that the probability of strong shaking in the giant metropolis of Istanbul is $62\pm 15\%$ during the next 30 years and $32\pm 12\%$ during the next decade (Parsons et al, 2000).

The earthquake did extensive damage to residential and industrial buildings in Izmit and surrounding areas near Istanbul. Property damage and some deaths occurred in Istanbul. The most damage and casualties were in the towns on both shores of the Gulf of Izmit. A large number of multi-story concrete apartment buildings collapsed. A large percentage of the severely damaged and collapsed buildings were typically in the 6 to 8 storey range. The damaged components of elevator installations in this earthquake are listed as follows:-

- Counterweights out of their rails and some colliding with the cars
- Hoisting ropes damaged or out of their sheaves
- Rail brackets broken or damaged
- Governor cable hung up
- Guides broken or loose
- Compensating cables out of their grooves or damaged
- Some hoistways collapsed and the cars buried at the bottom

5.2 The Seattle Earthquake

The Earthquake occurred on February 28, 2001, and was one of the largest recorded earthquakes in Washington state history. The quake measured 6.8 on the MMS and lasted approximately 45 seconds. The epicenter of the earthquake was Anderson Island, about 17 km (11 mi) northeast of Olympia. The quake caused some property damage in Seattle and surrounding areas. Although there were no reports of deaths directly from the earthquake, local news outlets reported that there was one death from a stress-related heart condition at the time of the earthquake.

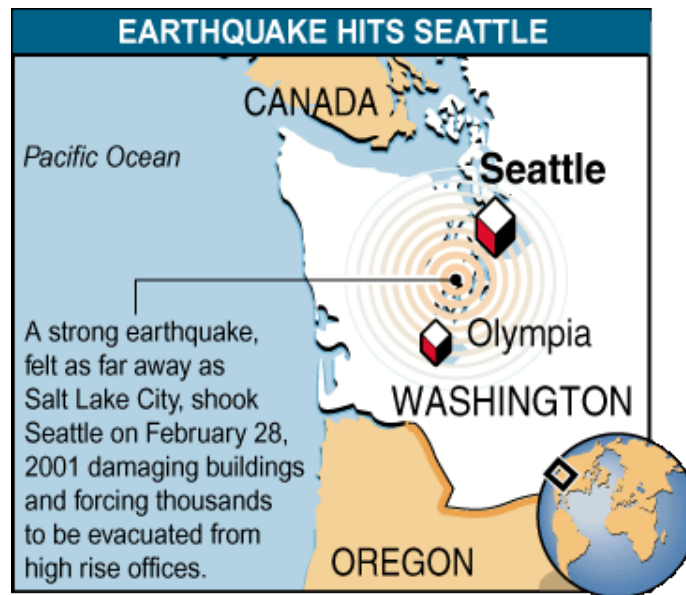


Figure 8. Earthquakes near Seattle in 2001

South of Seattle was hit very hard, as it was closer to the epicenter. After the earthquake states of 4472 electrical (traction) and 6176 hydraulic elevators were reported by the servicing firms. Of these 504 traction and 66 hydraulic units sustained damage. This indicates 11.3% of traction elevators were being damaged against only 1% of hydraulic elevators. The reported damages are as follows:-

Elevators coming out their guide rails	: 18
Counterweights came out their guide rails	: 224
Collisions between cars and counterweights	: 33
Machine beams displaced	: 3
Door entrance damaged	: 29
Rail brackets separated from walls/beams	: 77

Only 342 elevators had earthquake protection devices.

5.3 The Christchurch Earthquake

The 2010 Christchurch earthquake was a 7.1 magnitude earthquake, which struck the Southern Island of New Zealand at 4:35 am on 4 September 2010 local time.

The earthquake's epicentre was 40 kilometres (25 mi) west of Christchurch, near the town of Darfield. The epicenter was at a depth of 10 km. A foreshock of roughly magnitude 5.8 hit five seconds before the main quake, and strong aftershocks have been reported, up to magnitude 6.3. The initial quake lasted about 40 seconds, and was felt widely across the South Island, and in the North Island as far north as New Plymouth.

Since the earthquake happened at 4:35 in the early morning, the majority of elevators were stationary. In 1980's earthquake codes have included counterweight displacement sensors fitted on all buildings with over 15m of travel. These could be the main reasons for low damage by 2010 Christchurch earthquake. There were no entrapments in the initial earthquake however, 15 entrapments happened during aftershocks.

A survey of elevator service in Christchurch was tabled as follows:-

No of elevators	: 1936
No of displacement earthquake detector fitted	: 540
Counterweights out of their guide rails	: 30
Elevator shaft structural damage	: 2
Elevators required major repair/replacement	: 9
Elevators unable to be returned to service	: 50
Passenger entrapments during aftershocks	: 15

5.4 The March 11 Earthquake in Japan

The earthquake struck at 2:46 pm on March 11, with the epicenter approximately 70km east of the Oshika Peninsula of Tohoku in northeast Japan. Its magnitude was 9.0 in Richter scale at a depth of 32 km, which was one of the most powerful earthquakes known in the recorded history. The damage investigations into the elevators and escalators is still being conducted by the Japanese Elevator Association however, it is interesting to note that after the earthquake, there were 257 entrapments but in the following two weeks this number increased to 654 entrapments while, no accident causing injury or death related to entrapments were reported.

6. Discussion for earthquakes in Van region

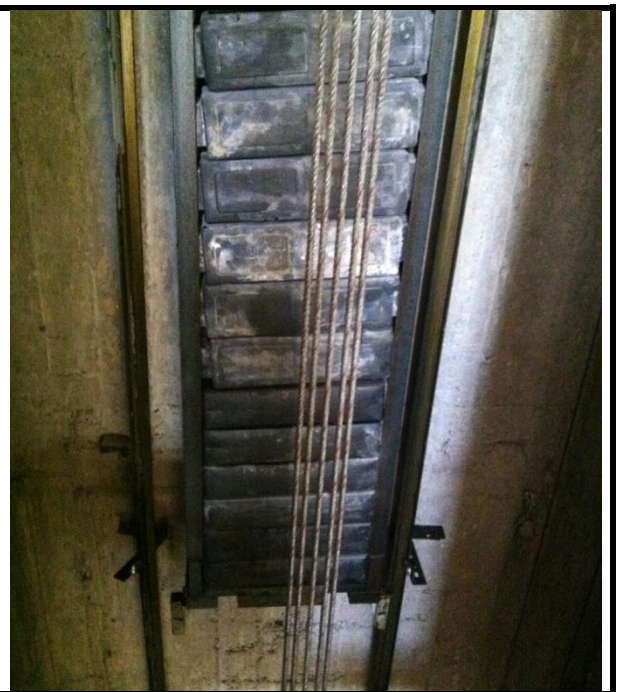
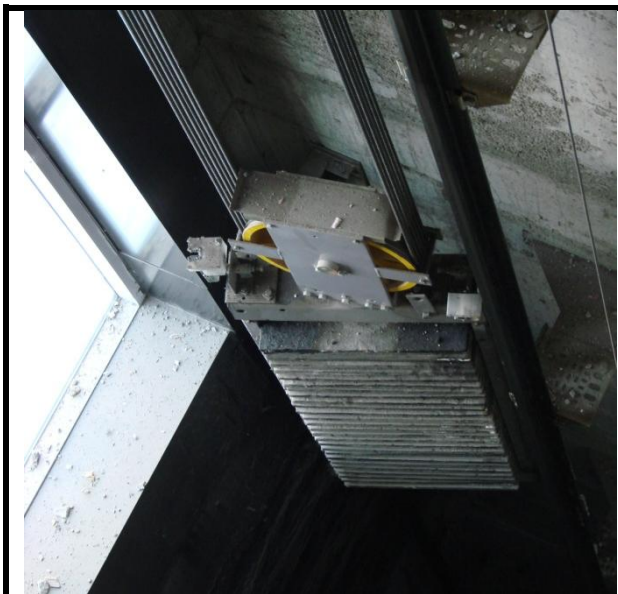
All examined elevators had no seismic detectors and all the car frames and the counterweight frames equipped with sliding guides. No roller type guides were observed which are essential in seismic regions.

Here is the general assessment of the observations on the damaged elevator systems:

- Due to characteristics of the earthquakes, most of the hauling ropes remained in their position over the sheaves. There were only 5 reported cases (out of 261) during repairment activities by the servicing firms, where the ropes came out of sheaves.
- Falling of counterweight slices on the car has been observed and reported as frequently encountered problem.
- As a result of our research and interviews with elevator servicing firms, traction machines haven't moved over their beam.
- In general, the view of all visits, the counterweights of the traction machines and MRLs came out of their guide rails. The main reasons for derailments were larger bracketing spans and insufficient installation practice that caused bent rails and brackets, and broken guide shoes.
- In some cases, hauling ropes are hanged out to guide rail brackets and supporting beams.
- No damages have been observed amongst the examined hydraulic elevators or reported by the interviewed servicing firms.
- Hydraulic elevators drive units were in good conditions and operable. No oil leakages related to the shakes were observed. In all applications hoses were used for cylinder connections.
- In most of the elevator systems, the landing doors were swing type and nearly all of them were in good condition, even in heavily damaged buildings. The center opening type doors were in general observed and reported as jammed with permanent damages.
- Hoistways made of concrete protects the floor-door frames and prevents door jamming. It also strengthens the building in many cases.

Counterweights out of their guide rails





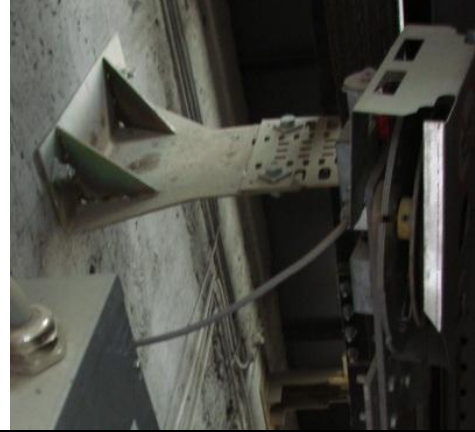
Counterweight frame bent



Guides broken or loose



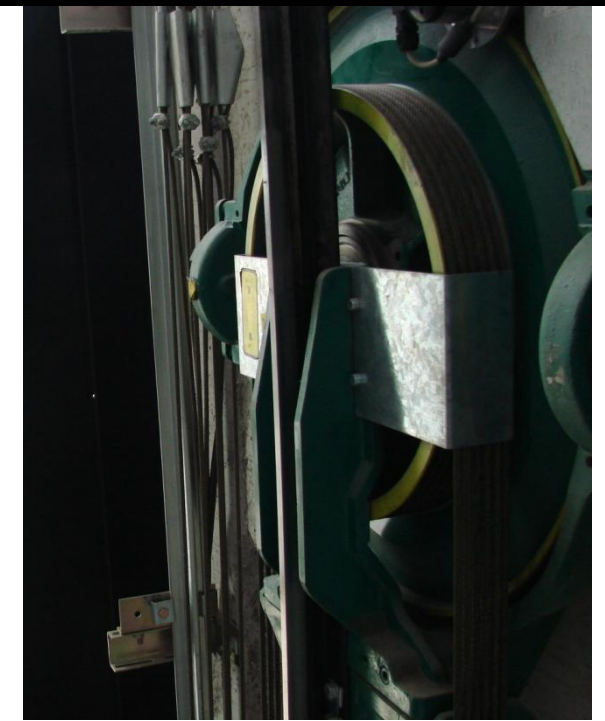
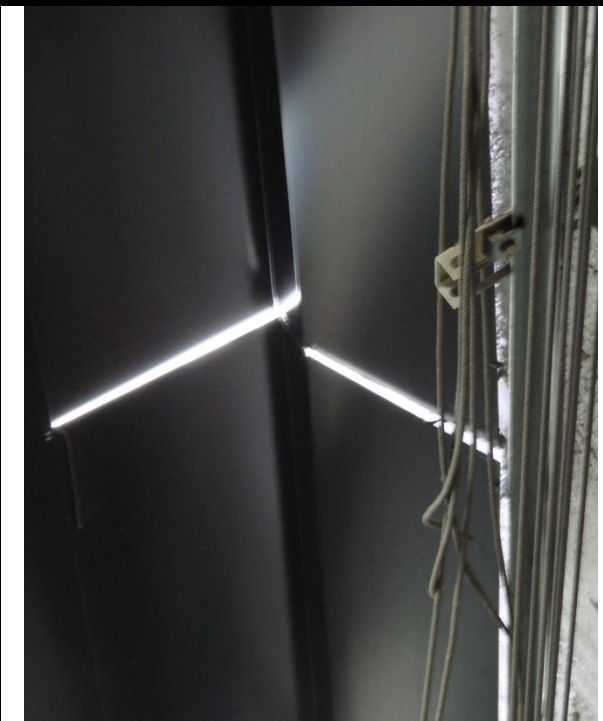
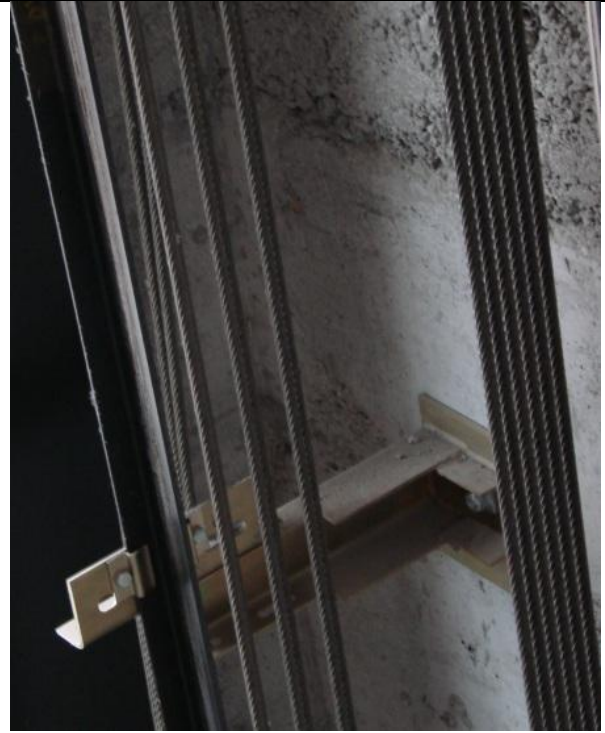
Bent guide rail brackets



Counterweight slice / bricks fall on the car



Hauling ropes damages



7. Countermeasures for elevators in seismic risk zones

Although the initial damage to elevators by a strong local earthquake is not often extensive, the displacement of counterweights from guides and wire ropes from pulleys can be hazardous and expensive if the elevators are permitted to continue operation. Because of their large mass, during an earthquake the counterweights experience large inertial forces that could damage the rails, brackets or guiding assemblies. To ensure the minimal damage to elevator systems in the event of an earthquake the following countermeasures should be taken.

Seismic Switches: utilize seismic energy to actuate useful functions. An elevator seismic switch functions as a normally open, switch until a significant earthquake occurs. An earthquake vibration causes an elevator seismic switch to transmit a switch closure to the elevators to continue to the next floor in a direction away from the counterweight.

Counterweight: is the heaviest component in an elevator system. A number of protective methods may be applied to prevent the counterweight from becoming disengaged. One method is that box brackets are used to reinforce the counterweight rails so as to restrain the counterweight from swinging out. Another method is installing an electrical detector which consists of a displacement ring attached to the counterweight and a stretched wire from top to bottom passing through it near the counterweight's path.

Guide Rails: The adequate size guide rail is used for a given bracket spacing and a given weight of counterweight or a given car weight plus 40% of its rated load. An adequate size guide-rail system will be capable of withstanding, without damage, a seismic force of $g/2$ horizontally. The requirement specifies a maximum allowable stress under seismic conditions which is $1/3$ larger than the stress allowed under normal conditions. The fishplate requirement assures a rail system without discontinuity that the standard type fishplate would introduce if it were used.

Brackets: The two guide rails are often linked to each other by intermediate tie brackets or box brackets to avoid spreading of the two rails and to decrease the chance of disengagement of the roller guide assembly from the rails.

Roller Guide: To prevent large deformations of the roller guide, and also to prevent the roller guides coming off the guide rails, restraining plates are required under the roller guide assemblies.

Structural Support Frames: The elevator guiderails and hoistway doors of three stories including the seismic isolator are supported with structural support frame. Fastening this support frame between the upper and lower hoistway allows the elevator to run up and down in the support frame when it is curved because of horizontal displacement during an earthquake or strong wind.

Other Protective Measures: In addition to the counterweight protective measures, the elevator hoisting machine and other machine room equipment is tied down with fastenings sufficient to withstand the expected shock. Rope guards are provided to prevent the ropes from jumping from the sheaves, and the car-to-counterweight compensating rope system is tied down with an arrangement to prevent the car and counterweight from bouncing upward during an earthquake shock. The elevator car is also equipped with retainer plates to maintain it within the rails. Anti-sag guards are required in the hoistway to prevent swinging ropes and traveling cables from hanging up.

8. Conclusions

Elevators are among the vital links of the modern infrastructure system. There is a considerable stock of elevators in the seismic risk zones of the Earth. The elevator systems are adversely affected by the earthquakes. The higher the magnitude of the shakes, the more the damage on elevator systems. The counterweight-rails and the car-guide rail systems are highly susceptible to earthquakes. The flexibility of guide-rails, brackets, and roller guide assemblies strongly affect their dynamic response to seismic disturbances.

Findings during the survey indicate that on low rise buildings, conventional hydraulic elevators are the most secure, practical and inexpensive solution for seismic regions. This is because the conventional hydraulic elevator does not have the counterweight, is supported by the foundation of the building and its hydraulic cylinder damps seismic shakes considerably. Therefore they are most resistant to damages by earthquakes. Steel tanks, rubber legs for noise prevention and flexible hoses prevent oil leakage unless building collapses completely. Easier and safer rescue operation for entrapped people is another advantage that hydraulic elevators offer.

For mid and high rise elevators, where counterweight is used, related countermeasures, some of which are listed in Section 5, should be applied to prevent derailment and to make elevators durable against seismic movements. During the investigation it was noticed that most of the derailments of the counterweights were mainly larger bracketing spans or generally weaker installation practice though, in some cases derailments occurred with short bracketing spans. As the elevator possesses the counterweight, there are obviously more countermeasures to apply in order to make it safer in seismic regions and it becomes more costly.

It can be ascertained from the earthquake statistics that the number of entrapments depends on the time of the day that the quake takes place. The initial earthquake may not cause many entrapments but it is normally followed by thousands of aftershocks during which the number of entrapments becomes more pronounced due to seismic detection devices and power cuts. Thus, ease of rescue operation for entrapped people should not be overlooked in seismic regions.

There is no doubt that safety codes as relating to seismic risk zones prevent countless injuries, many life losses, and costly damages. It is certain that millions of dollars have to be spent on modernizations and applications of improved safety systems such as major component displacement detection devices, guide rail keepers, appropriate equipment tie-downs, driving rope sheave guards, seismic switches for building sway (for elevators running faster than 0.75 m/s), and hoistway snag guards, etc. in order to ensure the minimal damage to elevator systems in the seismic zones in the years ahead.

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Appendix A – Buildings and elevators in Erciş

Building name	İtimat Apt.
Address	Van Yolu – Erciş
No of floors	7
Elevator	
Capacity	320 kg
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails Broken guide shoes of counterweight frame Loose safety gear trigger rope Landing doors were safe and in operation Counterweight was at above position.	



Building name	Özlem Apt. A-Blok
Address	Van Yolu – Erciş
No of floors	6
Elevator	
Capacity	4 kişilik
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	6
<u>Observations :</u> Counterweight frame out of its rails Broken guide shoes of counterweight frame Rail brackets broken or damaged Landing doors were safe and in operation Counterweight was at above position.	



Building name	Özlem Apt. B-Blok
Address	Van Yolu – Erciş
No of floors	6
Elevator	
Capacity	4 kişilik
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	6
<u>Observations :</u> Counterweight frame out of its rails Broken guide shoes of counterweight frame Rail brackets broken or damaged Landing doors were safe and in operation Counterweight was at above position.	



Building name	Aksöz Sitesi B-Blok
Address	Van Yolu – Erciş
No of floors	6
Elevator	
Capacity	4 kişilik
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	6
<u>Observations :</u> Counterweight frame out of its rails Landing doors were safe and in operation Counterweight was at above position.	



Building name	Reşit Çelik Primary School
Address	Near the Lake Van – Erciş
No of floors	3 + basement
Elevator	
Capacity	630 kg (for disabled)
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	4
<u>Observations :</u> Counterweight rails damaged.	



Appendix B – Buildings and elevators in Edremit.

Building name	Van İhtisas Hospital
Address	Edremit -Van
No of floors	5
Elevator	
Capacity	630 kg
Contract speed	0.63 m/s
Drive	Hydraulic (indirect side acting)
No of stops	5
<u>Observations :</u> No observed damage. Safety gear engaged It was out-of-service before the earthquakes.	



Building name	Van İhtisas Hospital
Address	Edremit -Van
No of floors	4 + basement
Elevator	(Lift A)
Capacity	900 kg
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	5
Observations : No damage in the well. Landing doors had problems	



Building name	Van İhtisas Hospital
Address	Edremit -Van
No of floors	4 + basement
Elevator	(Lift B)
Capacity	900 kg
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	5
<u>Observations :</u> No damage in the well. Landing doors had problems	



Appendix C – Buildings and elevators in the city center.

Building name	Koza İşmerkezi
Address	Milli Egemenlik Cad. No.43 Van Merkez
No of floors	2
Elevator	
Capacity	500 kg
Contract speed	0.15 m/s
Drive	Hydraulic (indirect side acting)
No of stops	2
<u>Observations :</u> No damage at all.	



Building name	Haydaroğlu İşmerkezi
Address	Milli Egemenlik Cad. No.43, City center of Van
No of floors	8
Elevator	(Lift A)
Capacity	630 kg
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	8
<u>Observations :</u> No damage at all.	



Building name	Haydaroğlu İşmerkezi
Address	Milli Egemenlik Cad. No.43, City center of Van
No of floors	8
Elevator	(Lift B)
Capacity	630 kg
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	8
<u>Observations :</u> No damage at all.	



Building name	AKKA Gizem Sitesi B Blok
Address	Milli Egemenlik Cad. No.50, City center of Van
No of floors	6
Elevator	
Capacity	320 kg
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	6

Observations :

Counterweight was below the car.

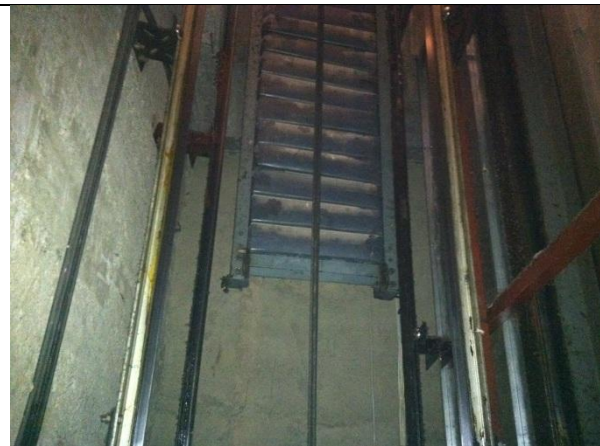
Counterweight frame out of its rails

Rail brackets damaged.

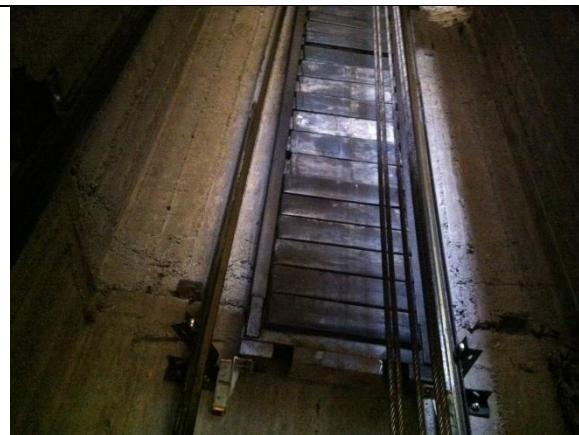
Landing doors were safe and in operation



Building name	TOKI 426 Housing project
Address	Bardakçı Köyü, City center of Van
No of floors	7
Elevator	
Capacity	630 kg
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight was below the car. Counterweight frame out of its rails Broken guide shoes of counterweight frame Landing doors were safe and in operation	



Building name	Bina 1
Address	City center of Van
No of floors	5
Elevator	
Capacity	320 kg
Contract speed	0.8 m/s
Drive	Traction machine with machine room
No of stops	5
<u>Observations :</u> Counterweight ws below the car. Counterweight frame out of its rails	



Building name	Bina 2
Address	City center of Van
No of floors	6
Elevator	(Lift A)
Capacity	630 kg
Contract speed	1.0 m/s
Drive	MRL
No of stops	6
<u>Observations :</u> Counterweight was below the car. Counterweight frame out of its rails Broken guide shoes of counterweight frame	



Building name	Bina 3
Address	City center of Van
No of floors	6
Elevator	(Lift B)
Capacity	630 kg
Contract speed	1.0 m/s
Drive	MRL
No of stops	6
<u>Observations :</u> Counterweight was below the car. Counterweight frame out of its rails Broken guide shoes of counterweight frame	



Building name	Shopping center
Address	City center of Van
No of floors	2
Elevator	
Capacity	1000 kg
Contract speed	0.15 m/s
Drive	Hydraulic lifting platform (indirect side acting)
No of stops	2
<u>Observations :</u> No damage at all.	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.1
Capacity	1600 kg (21 person)
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails Landing doors had problems	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.2
Capacity	320 kg (4 person)
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.3
Capacity	1600 kg (21 person)
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight was out of it rails. Repaired after the first quake.	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.4
Capacity	1000 kg (13 person)
Contract speed	1 m/s
Drive	Traction machine with machine room
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.5 (panoramic elevator)
Capacity	1600 kg (21 person)
Contract speed	1 m/s
Drive	MRL
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails. Landing doors jammed and had problems Hauling ropes hanged out on brackets	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.6 (panoramic elevator)
Capacity	1600 kg (21 person)
Contract speed	1 m/s
Drive	MRL
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails. Landing doors jammed and had problems Ropes broken and hanging out on brackets.	



Building name	Medical Park Hospital
Address	Selimbey mah. Kale Yolu – Van
No of floors	7
Elevator	No.7 (panoramic elevator)
Capacity	1600 kg (21 person)
Contract speed	1 m/s
Drive	MRL
No of stops	7
<u>Observations :</u> Counterweight frame out of its rails Hoisting ropes out of sheave	

