

ANNEX - 8

List of Research Topics Studied in the Project

(EER Subcenter - Structure I - by Prof. H. Frauk Karaoğan)

	Topic	Duration	Coverage	Participated Japanese Expert	Turkish Counterpart
1.	Strengthening the reinforced brittle masonry	2 years	For determining the effectiveness of a special strengthening techniques on brick walls	Dr. Okada Dr. Fukuta	HFK-EY
2.	Special partitioning wall by different type bricks	2 years	Effects of different types of brick walls on the behavior of plane RC frames (special shear key formed by a special workmanship during brick work)	Dr. Okada Dr. Fukuta	EY-HFK
3.	Special partitioning wall by shotcrete	1 year	For determining the behavior of partitioning walls constructed by a special wall construction techniques (lightweight non-structural elements and easy construction)		HFK-EY-AI-WM
4.	The general behavior of 3D special low cost house	1 year	For determining the behavior of a special building construction techniques (lightweight non-structural elements and easy construction)	Dr. Saisho	HFK-WM-EY-AI-KD
5.	Prefabricated columns and their sockets	2 years	For determining the difference between incast and prefabricated columns subjected to axial lateral loads (whether the grout cast between the column and socket has negative influence on the behavior or not)		AI-KD-EY-HFK
6.	Strengthened prefabricated columns and their socket	2 years	For determining the behavior of prefabricated and incast frames strengthened by jacketing		AI-KD-HFK
7.	Assembled floor systems by special brick elements	1 year	For determining the behavior of a new, cheap and lightweight slab construction technique		EY-AI-KD HS-HFK
8.	Assembled floor systems by shotcreting	4 months	For determining the behavior of another kind of new, cheap and lightweight slab construction technique		AI-KD-HS-HFK
9.	Strengthening of assembled floor system	6 months	For determining the of two different strengthening techniques on the behavior of damaged assembled floor systems, determining the natural periods of these floor systems before and after failure and before and after strengthening		AI-KD-HFK-HS-EY
10.	Assembled floor systems subjected to repeated loading	6 months	For determining the effects of the number of cycles on the strength and rigidity of assembled floor systems, determining the rigidities of these floor systems at various cycle number by microtremor measurements		AI-KD-HS-HFK

	Topic	Duration	Coverage	Participated Japanese Expert	Turkish Counterpart
11.	Hollow core prestressed slabs	1 year	For determining the behavior under repeated loading (microtremor measurements are also carried out to determine the natural period of slabs at different load cycles and ultrasound measurements are carried out in order to find correlation between damage level and ultrasound measurement results)		HFK-EY EO-AE-AI- OG
12.	Microtremor measurements on damaged buildings	15 days	To define the dynamic characteristics of the damaged buildings	Dr. Hayashi Dr. Sugai	HFK-HB-AE- EY-KD
13.	Microtremor measurements on strengthened structure	1 week	To understand the effectiveness of strengthening on damaged buildings	Dr. Hayashi Dr. Ovada	HFK-UDE- AB-AK
14.	Microtremor measurements on beams	several years	To assess the level of damage by micro tremor measurements		EY-AI-KD- HS-HFK and other students
15.	Confinement of R.C. columns with circular cross section	6 months	An experimental study for determining the effect of different amount and type of confinement reinforcement on the strength and ductility of columns under axial loads	Dr. Fukuta	AI-PO

Abb.	Name	Academic Status
HFK	H. Faruk KARADOĞAN	Dr.
EY	Ercan YÜKSEL	Ph.D.Student
AI	Alper İLKi	Ph.D.Student
KD	Kutlu DARILMAZ	Ph.D.Student
HS	Hakan SARUHAN	Civil Engineer
UDE	Umut Devrim ERSİN	Graduate Student
AE	Almyla ERÖZ	Ph.D.Student
WM	Wheiel MOURTAGE	Ph.D.Student
OG	Ömer GÜZEL	Graduate Student
AB	Arda BALCI	Undergraduate Student
HB	Hasan BODUROĞLU	Dr.
PO	Pınar ÖZDEMİR	Ph.D.Student
PZ	Pervin ZAHYRTAR	Ph.D.Student
AK	Ali KOÇAK	Ph.D.Student
EO	Engin ORAKDOĞEN	Dr.

EER Subcenter - Structure2 - by Prof. Dr. Hasan Bodurođlu

	Topic	Duration	Coverage	Participated Japanese Expert	Turkish Counterpart
	(completed)				
A-1	Repair and Strengthening of Short Columns		The object of this research is to find an efficient and reliable method to repair and strengthen reinforced concrete short columns in existing and damaged structures. In experimental research work two approaches were used. One is the application of external steel laminates to columns using epoxy adhesives. The other one is the application of post tensioned metal strips to columns using a strapping tool together with metal clips. The preliminary results were presented in the proceedings of the 11 WCEE.		Prof. Dr. H. Bodurođlu and P. Özdemir (Graduate Research Assistant)
A-2	Microtremor Measurements on Buildings and Ground in Istanbul and in Dinar		Microtremor measurements were taken on a hospital building in Istanbul and on damaged buildings in Dinar to study the vibrational characteristics of these buildings.	Prof. Dr. Masashi Hayashi, Prof. Dr. Michiyo Sugai	Prof. Dr. H. Bodurođlu, Dr. A. Gedikim (Graduate Research Assistants), Dr. R. Iyisan, H. Ünol, F. Duman
A-3	Beam Column Joint Tests		The objective of these tests is to investigate the effect of stir-ups in the beam-column joints and also the effect of replacing the stir-ups by 45 degree hooked steel bars as a special detailing for easier workmanship.		Prof. Dr. H. Bodurođlu, P. Özdemir and P. Zahirton (Graduate Student)
	(on going)				
B-1	Microtremor Measurements of Strengthened Reinforced Concrete Building in Dinar		In order to evaluate the effect of strengthening on reinforced concrete structures microtremor tests were carried out in Dinar. Evaluation of the data is being continued.		Prof. Dr. H. Bodurođlu, Dr. A. Gedikim, P. Özdemir, and P. Zahirton
B-2	Experimental Work on Plain Masonry Walls		The behavior of plain masonry walls under cyclic loading will be investigated together with the strengthening methods. Experimental work will be carried out in the fall of 1997 on the seismic behavior of plain masonry walls made of hollow core bricks.		Prof. Dr. H. Bodurođlu, P. Özdemir and two graduate students
B-3	Effect of In-Filled Walls on the External Beam-Column Joints		The negative effect of in-filled walls on beam-column joints will be studied both theoretically and experimentally.		Prof. Dr. H. Bodurođlu, Ms. P. Gündes (PhD. Students)

[EER Subcenter - Soil]

	Topic	Duration	Coverage	Participated Japanese Expert	Turkish Counterpart
1.	Specific site investigations utilizing in-situ seismic wave measurements and related site amplification studies in Istanbul.	2 months 2 months	In-situ seismic tests at Levent site In-situ tests at Gurpinar site	- -	AA & RI AA, RI, HY
2.	Specific site investigation utilizing in-situ seismic wave measurements and microtremor measurements and related site amplification for site in Bursa.	9 months	In-situ seismic tests and microtremor measurements	MS	AA, RI and 3 grad. Students
3.	Microtremor measurements at the strong motion stations in Istanbul.	4 months	Measurements at 10 stations	MS	AA, RI and 1 grad. student
4.	Microtremor studies and preliminary microzonation for the town of Dinar.	9 months and still going on	In-situ static penetration tests and microtremor measurements	MS, SI	AA, RI, AE and 3 grad. students
5.	Residual strength behavior of compacted clays	7 months	Series of tests on compacted clay samples	MY	AA, RI, AS and 1 grad. student
6.	Cyclic, static and post cyclic behavior of sands	9 months and still going on	Series of cyclic torsional shear tests	SY, SI, MY	AE, AS, AA and 2 grad. students
7.	Soil investigation for microzonation in Istanbul	6 months	In-situ seismic test and boring test	SI	AA, HY

Abb.	Name	Academic Status
AA	Atilla ANSAL	Prof. Dr.
AE	Ayfer ERKEN	Assoc. Prof. Dr.
HY	Hüseyin YILDIRIM	Assoc. Prof. Dr.
RI	Recep İYISAN	Dr.
AS	Atilla SEZEN	Ph.D. Student
MS	Michiyo SUGAI	Dr.
SY	Susumu YASUDA	Prof. Dr.
SI	Shunichi IGARACHI	Dr.
MY	Mitsutoshi YOSHIMINE	Dr.

ANNEX - 9

List of Data Collected and Stored in the Project

[EDCVI Subcenter]

- (1) For Temporal Seismic Observation and Data Analyses, around 70 microtremor measurements were carried in 1994 and 1995 with the equipment provided for the Project, and analyses, including signal-to-noise ratio, were conducted for every candidate local stations (3 to 4 sites for each stations), and the site for the stations were determined.
- (2) For Seismic Activity Research, seismic motion records in 1900 - 1993 and 1994 were collected and analyzed.
- (3) For the Database for the intelligent system, large amount of data were collected.

[EER Subcenter - Structure]

Data	Number of Buildings /Specimens
Microtremor Measurements Recorded and Stored	
1. 28 story building	1
2. 10 story Esenkent building	3+2
3. 7 story Özlem residential house	1
4. 5 story building constructed before 1975 in ITU Campus	1
5. 5 story building constructed after 1975 in ITU Campus	1
6. 2-3-4-5-6 story damaged buildings in Dinar	5
7. 2-3-4-5-6 story strengthened buildings in Dinar	5
8. 5 story strengthened building in Dinar (Öğretmen Evleri)	1
9. 5 story new building with shear wall (afet Konullary)	1
10. Laboratory building before and after the construction of shear wall	1+1
11. Beams tested on several loading stages	
(1) Hollow core beams	15
(2) Prefabricated long span beams	3
(3) Precast concrete assembled floor beams	25

[EER Subcenter - Soil]

Data	Number/Volume
1. Microtremor measurement data for the town of Dinar.	50 sets of microtremor and 3 CPT test data
2. Microtremor measurement and seismic wave velocity data for the site in Bursa	4 PS logging, 3 cross-hole, 20 sets of microtremor data
3. Microtremor measurement data for the strong motion stations in Istanbul.	10 sets of microtremor data
4. Strong motion data from the Dinar Earthquake sequence	
5. Strong motion data from the Istanbul strong motion stations	26 strong motion records

ANNEX - 10

List of Documents Issued as the Results of the Project

[EDCVE Subcenter]

1. Hüseyin Güler, 1996, Deprem Zararlarının Azaltılması Araştırması Merkezi, Bilim Teknik Dergisi, 54-57 s. ☺
2. Hüseyin Güler, 1997, Deprem Zararlarının Azaltılması Çalışmaları. Teknolojik Güvenlik Dergisi, 30-34 s. ☺
3. Uğur Kuran, 1995, İki Kobe depremi ve düşündürdükleri, Bilim Teknik dergisi, 17-19 s.
4. Uğur Kuran, 1995, Anadolu çevresinde Tsunamiye yol açan sismik olaylar, Bilim ve Teknik dergisi, 22-25 s.
5. Uğur Kuran, Ahmet Yalçiner, 1993, Crack propogation earthquakes and Tsunamis in the vicinity of Anatolia, Tsunami in the world: Kluwer academic publishers, 159-177 p.
6. Ahmet Yalçiner, Uğur Kuran, Adnan Akyarlı, F. Imamura, 1995, Tsunami: Progres in prediction. Disaster prevention and warning: Kluwer academic publishers, 55-70 p. ☺
7. Ahmet Yalçiner, Uğur Kuran, Adnan Akyarlı, F. Imamura. 1993, An Investigation of the propagation of Tsunamis in the Aegean Sea by Mathematical modeling, Sixteenth International Tsunami Symposium, 111-129 p.
8. Hiromi Shima, Bekir Tüzel, Fikri Öztürk, Salih Karakısa, Aydın Büyüksaraç, 1995, The seismological approach for Turkish-Japanese project area. Symposium of Earthquake Disaster Prevention Research, 42-56 p. ☺
9. Noritoshi Goto, Adem Sömer, Bekir Tüzel, Engin Çoruh, 1995, Earthquake detection capability analysis by measuring microtremor, Symposium of Earthquake Disaster Prevention Research, 91-109 p. ☺
10. Sinan Gençoğlu, Bülent Özmen , Hüseyin Güler , 1996, Yerleşim Birimleri ve Deprem, Türkiye Deprem Vakfı Kitabı, 80 s
11. Bülent Özmen, Murat Nurlu, 1996, Deprem Zararlarının Azaltılması Çalışmaları, Türkiye Üçüncü Arc/Info ve Eidas Kullanıcılar Grubu Toplantısı, 12-23 s. ☺
12. Bülent Özmen, Murat Nurlu, Hüseyin Güler, 1997, Coğrafi Bilgi Sistemi ile Deprem Bölgelerinin İncelenmesi, Bayındırlık ve İskan Bakanlığı Afet İşleri Genel Müdürlüğü Yayını, 100 s.

13. Fikri Öztürk, Abdullah Ateş, Yusuf Kadioğlu, 1997, Geophysical Investigation into the deep structure of the Kesikköprü-Keskin Region, Central Turkey, International Geophysical Conference and Exposition, Abstract, 246 p.
14. Murat Nurlu, Bülent Özmen, Hüseyin Güler, 1995, Prevention of Earthquake Disaster by Geographical Information System, Symposium of Earthquake Disaster Prevention Researches, 5-22 p. ☺
15. Murat Nurlu, Vedat Öz Saraç, Bülent Özmen, 1997, A Case of Study Using Remote Sensing and GIS Techniques After Dinar (SW Turkey) Earthquake, International Symposium on Geology and Environment, September 1-5, Abstract, 67 p.
16. Murat Nurlu, Bülent Özmen, 1995, Deprem Zararlarının Azaltılmasında Coğrafi Bilgi Sistemi, TUJJB 100. Yıl Simpozyumu, 1421-1434 s. ☺
17. Murat Nurlu, Bülent Özmen, Şeref Saygılı, 1995, Depremlerin önceden belirlenmesi çalışmalarında radon yöntemi ve kuzey anadolu fay zonunda yapılan çalışmalar, TUJJB 100. Yıl simpozyumu, 1008-1023 s.
18. Murat Nurlu, 1993, Kuzey anadolu fay zonunda (Bolu-Sapanca gölü arası) etken olan gerilimlerin fay analizleri ve uydu görüntüleri yardımıyla saptanması, Türkiye Jeoloji Kurumu Bülteni, 258-266 s.
19. Murat Nurlu, Şeref Saygılı, Kuzey anadolu fay zonunda (Dokurcu-Akyazı) radon ölçümleri, Türkiye Jeoloji Kurumu Bülteni, 267-277 s.
20. Orhan Cerit, Fikret Sezen, Murat Nurlu, Vedat Öz Saraç, Nilüfer Saraç, Baysal Batman, 1994, Adapazarı ve yakın yöresinin neotektonik özellikleri, 17. Türkiye Jeoloji Kurultayı, 168-169 s.

***** · TURKISH COUNTERPART

☺ : RELATED DIRECTLY PROJECT

[IIEER Subcenter - Structure]

No.	Title	Author	Remarks
1.	Microtremor Measurements and Possible Earthquake Response of Existing Structures	Ercan YÜKSEL, Alper İLKI, Shin KOYAMA, Faruk KARADOĞAN,	III. National Conference on Earthquake Engineering, March 1995, Istanbul.
2.	Structural Behavior of Prestressed Hollow Core Slab Elements Subjected to Repeated Loading I	Faruk KARADOĞAN, Ercan YÜKSEL, Engin ORAKDÖĞEN, Alper İLKI, Almila ERÖZ	Honorary Seminar for Professor Turgan Sabis, 1995, Istanbul.
3.	Structural Behavior of Prefabricated Slab Elements I	Faruk KARADOĞAN, Ercan YÜKSEL, Alper İLKI	A Technical Report, February 1995, Istanbul.
4.	Structural Behavior of Prestressed Hollow Core Slab Elements Subjected to Repeated Loading I	Faruk KARADOĞAN, Ercan YÜKSEL, Engin ORAKDÖĞEN, Alper İLKI, Almila ERÖZ	A Technical Report, March 1996, Istanbul.
5.	Controlled Overall Ductility of Frame Structures	W. MOURTAGE	M. Sc. Thesis submitted to ITU, 1996 (Supervised by Faruk KARADOĞAN)
6.	Plastic Hinge Capacities, Curvature and Structural Ductility of Reinforced Concrete Structures	Adnan ÇAKIROĞLU, Faruk KARADOĞAN	First Japan-Turkey Workshop on Earthquake Engineering March 1997, Istanbul.
7.	Deformability Limits and Ductility of Reinforced Concrete Bare Frames	Faruk KARADOĞAN, Ercan YÜKSEL, Alper İLKI	First Japan-Turkey Workshop on Earthquake Engineering March 1997, Istanbul.
8.	Complete Stress-Strain Behavior of Confined Concrete Under Compression	Alper İLKI, Pinar ÖZDEMİR, Toshimuni FUKUTA	First Japan-Turkey Workshop on Earthquake Engineering March 1997, Istanbul.
9.	A special Reinforced Brick Masonry Walls and a Strengthening Technique	Ercan YÜKSEL, Alper İLKI, Faruk KARADOĞAN	(to be Published)
10.	The behavior of Prefabricated Columns Subjected to Lateral Loads	Alper İLKI, Ercan YÜKSEL, Faruk KARADOĞAN	(to be Published)
11.	Free Vibration Characteristics of Some Damaged Buildings on 1995 Dinar Earthquake	Faruk KARADOĞAN, Ercan YÜKSEL, Almila ERÖZ, Kullu DARILMAZ, Umut Devrim ERSİN, Hakan SARUHAN	(to be Published)
12.	Structural Behavior of Precast Columns and Their Socket Base Connections - I	Faruk KARADOĞAN, Ercan YÜKSEL, Alper İLKI, Hakan SARUHAN, Kullu DARILMAZ, Ömer GÜZEK	IV. National Conference on Earthquake Engineering, 17-19 September 1997, Ankara.

No.	Title	Author	Remarks
13.	The Effect of a Special Partitioning Wall on 2D Frame Behavior and Strengthening	Ercan YÜKSEL, Alper İLKI, Faruk KARADOĞAN	TÜBİTAK II. Earthquake Symposium, 27-28 November 1997, Ankara.
14.	Strengthened Prefabricated Slab Systems	Alper İLKI, Kutlu DARILMAZ, Ercan YÜKSEL, Faruk KARADOĞAN	TÜBİTAK II. Earthquake Symposium, 27-28 November 1997, Ankara.
15.	The Behavior of Prefabricated Slab Systems under Monotonic and Repeated Loading	Alper İLKI, Kutlu DARILMAZ, Ercan YÜKSEL, Hakan SARUHAN, Faruk KARADOĞAN	TÜBİTAK II. Earthquake Symposium, 27-28 November 1997, Ankara.
16.	Structural and Earthquake Engineering Laboratory of Istanbul Technical University	Faruk KARADOĞAN, M. HAYASHI, M. SAISHO	TÜBİTAK II. Earthquake Symposium, 27-28 November 1997, Ankara.
17.	The Behavior of Socket Base Prefabricated Columns Under Lateral Loads	Alper İLKI, Kutlu DARILMAZ, Ercan YÜKSEL, Faruk KARADOĞAN	TÜBİTAK II. Earthquake Symposium, 27-28 November 1997, Ankara.
18.	Free Vibrational Characteristics of Several Buildings Damaged During Earthquakes	Faruk KARADOĞAN, U. Devrim ERSİN, Almila ERÖZ, Ercan YÜKSEL, Kutlu DARILMAZ, Hakan SARUHAN,	Professor Rıfat Yazar Symposium, 10 December 1997, Istanbul.
19.	A New and Efficient Approach for Repair and Strengthening of Short Columns	Pınar Özdemir and Hasan Boduroğlu	Eleventh World Conference on Earthquake Engineering, May 23-28, 1996, Mexico.
20.	An Experimental Study on Reinforced Concrete Beam-Column Joints	Hasan Boduroğlu, Pınar Özdemir and Pervin Zahirar	First Japan - Turkey Workshop on Earthquake Engineering, pp. 113-124, Istanbul Technical University, March 27-29, 1997, Istanbul.
21.	An Experimental Study on Shear Reinforcement of Beam-Column Joints	Pınar Özdemir, Hasan Boduroğlu and Pervin Zahirar	Fourth National Conference on Earthquake Engineering, pp. 188-195, September 17-19, 1997, METU, Ankara.
22.	Microtremor Measurements of Damaged Buildings in 1995 Dinar Earthquake	Hasan Boduroğlu, Masoshi Hayashi, Michiyo Sugai, Abdulah Geddi, Hale Unal, Recep İyison, Feridun Duman	Fourth National Conference on Earthquake Engineering, pp. 165-172, September 17-19, 1997, METU, Ankara.
23.	Experimental Work on the Shear Reinforcement in Beam-Column Joints	Hasan Boduroğlu, Pervin Zahirar and Pınar Özdemir	TÜBİTAK II Earthquake Symposium on Experimental Methods, Ankara, November 27-28, 1997
24.	Shear Strength and Strengthening of Short Column	Pınar Özdemir, Hasan Boduroğlu	ditto
25.	Confinement Effect of Reinforced Concrete Columns with Circular Cross-Section	Alper İLKI, Pınar ÖZDEMİR, Toshihumi FUKUTA	BRI Research Paper, ISSN 0453-4972, Paper No. 143, July 1997, Building Research Institute, Ministry of Construction, Japan
26.	Repair and Strengthening of Short Columns	Pınar ÖZDEMİR	Ph. D. Thesis, July, 1997

[EER Subcenter - Soil]
(Graduate Thesis)

No.	Title	Author	Remarks
(completed)			
1.	Residual Strength of Compacted Clays	C. Baybon	MS Thesis, June 1997
2.	Microtremor Measurements in Dinar and Comparison with In-Situ Tests	M. Ozkon	MS Thesis, February 1997
3.	Determination of Local Geotechnical Effects of Earthquake by Microtremor Measurements	N. Kaya	MS Thesis, February 1997
4.	The Analysis of Earthquake Records and Microtremor Measurements in the Strong Motion Stations in Istanbul	F. Duman	MS Thesis, July 1996
5.	Steady State of Sands	M. Degerli	MS Thesis, June 1996
6.	The Liquefaction of Silty Sands and Sandy Silts	C. Kilit	MS Thesis, June 1995
7.	Liquefaction of Silty Soils	T. Sancar	MS Thesis, June 1995
8.	Experimental Results on Different Transverse Reinforcement in Beam Column Joints	P. Zahirfar	MS Thesis, February 1997
9.	Comparison of Seismic and Penetration Tests in the Determination of Geotechnical Properties	R. Iyisan	Ph.D. Thesis, 1994
10.	Comparison of Seismic and Penetration Tests in the Determination of Geotechnical Properties	P. Özdemir	Ph.D. Thesis, July 1997
(On-going)			
1.	Microzonation of Dinar Based In-situ Test Results and Microtremor Measurements	H. Güllü	Ph. D Thesis
2.	Cyclic testing of undisturbed soils to be used for site response analysis	V. Korur	Ph.D. thesis
3.	Evaluation and Comparison of In-situ seismic wave and microtremor measurements with dynamic laboratory test results related in the town of Dinar	S. Altun	Ph.D. Thesis
4.	Stress-Strain Behavior of Soils	A. Sezen	Ph. D. Thesis
5.	Liquefaction Potential of Silty and Clayey Sands	R. Ozd	Ph.D. Thesis
6.	Analysis of Pore Pressure Buildup During Liquefaction	C. Kilit	Ph.D. Thesis
7.	Evaluation of site specific design ground motion	B. Erdener	MS thesis

[IER Subcenter - Soil]
(Papers)
(in English)

No.	Title	Author	Remarks	Pages
1.	Post Earthquake Microzonation of Dinar	Ansal, A., Güllü, H., & Iyison, R.	1998, XI Danube Conference on SMFE, Porec, Croatia (abstract accepted paper is being prepared)	
2.	A Preliminary Microzonation Study for the Town of Dinar	Ansal, A., Iyison, R. & Ozkan, M.	1997, Seismic Behavior of Ground and Geotechnical Structures, Proc. of Special Technical Session on Earthquake Geotechnical Engineering, 14th ICSMFE, Balkema, Rotterdam	pp.3-9.
3.	Site Effects on Damage Distribution in 1995 Dinar Earthquake	Ansal, A. & Iyison, R.	1997, 29th General Assembly of International Association of Seismology and Physics of the Earth Physics, Thessaloniki, Greece,	Abstract Volume pp.14
4.	Seismic Hazard and Earthquake Characteristics in Istanbul	Ansal, A.	1997, International Conference on Soil Dynamics and Earthquake Engineering, Istanbul, Turkey,	Volume of Extended Abstracts pp.124- 130
5.	Microtremor Studies of Damage Distribution in Dinar	Ansal, A., Iyison, R. and Ozkan, M.	1997, First Japan-Turkey Workshop on Earthquake Engineering, Istanbul, Vol.2 on Microzonation for Geotechnical Hazards	pp. 24- 130
6.	Effects of Geotechnical Factors in Earthquakes and Microzonation	Ansal, A. M.	1996, Special Symposium on Seismic Microzonation, XXV General Assembly of European Seismological Commission, Reykjavik, Iceland (invited lecture), Abs.Vol.	pp.93
7.	Effects of Source and Site Characteristics During Earthquakes	Ansal, A. M., Duman, F., & Iyison, R.	1996, Special Symposium on Seismic Hazard, Risk and Earthquake Impact, XXV General Assembly of European Seismological Commission, Reykjavik, Iceland,	Abs.Vol. pp.83.
8.	Harmonization of Risk in Seismic Hazard Analysis	Ansal, A. M.	1996, Invited Lecture in the Special Session on Earthquake Engineering, XXV General Assembly of European Seismological Commission, Reykjavik, Iceland,	Abs. Vol. pp.122
10.	Damage Distribution in 1995 Dinar Earthquake	Ansal, A., Iyison, R., Sezeri, A., Duman, F. & Siyahi, B.	1996, XXIV General Assembly of ESC, Reykjavik, Iceland,	Abs. Vol. pp.97
11.	Settlement in Sands Due to Cyclic Loading	Erken, A. & Ansal, A. M.	1995, Eleventh African Regional Conference on Soil Mechanics and Foundation Engineering, Cairo, Vol. 3	pp.488- 493.
12.	Liquefaction of Silt and Sand Layers in Erzincan-Eksisu	Erken, A. & Ansal, A. M., Yildirim, H., Uker, R., Soncor, T. & Klic C.	1995, First Int. Conf. on Earthquake Geotechnical Engineering, Tokyo, Vol.1	pp.13- 18.

[EER Subcenter - Soil]
(Papers)
(in Turkish)

No.	Title	Author	Year	Remarks	Pages
1.	Characteristics of strong motion records obtained in Istanbul	Ansol, A., Iyison, R., Dumon, F. & Eyidogan, H.	1997	4th Turkish National Earthquake Engineering Conference, Ankara	pp.22-29
2.	Results of Microtremor Measurements in Dinar	Iyison, R., Ansol, A., Sezen, A. & Ozkan, M.	1997	4th Turkish National Earthquake Engineering Conference, Ankara	pp.104-111
3.	Comparison of Seismic Wave Velocity and Microtremor Measurements	Iyison, R., Ansol, A., & Kaya, N.	1997	4th Turkish National Earthquake Engineering Conference, Ankara	pp.96-103
4.	Correlations Between Shear Wave Velocity and In-Situ Penetration Test Results	Iyison, R.	1996	Technical Journal of Turkish Chamber of Civil Engineers, Vol. 7, No.2	pp.1187-1199
5.	Regional Planning with respect to Geotechnical Hazards in Earthquake Prone Areas	Ansol, A. M. and Siyohi, B.	1996	Habitat II, NGO Forum, 'Natural Disasters and Policies for Human Settlements Symposium', Istanbul	
6.	Liquefaction Potential of Sandy Silty Soil Layers in Erzincan-Eksisu	Erken, A., Ansol, A., Yildirim, H., Kile C., & Koro, B.	1996	6th National Conference on Soil Mechanics and Foundation Engineering, Izmir, Vol. 2	pp.533-541
6.	Comparison of In-Situ Penetration Test Results	Iyison, R. & Ansol, A.	1996	6th National Conference on Soil Mechanics and Foundation Engineering, Izmir, Vol. 1	pp.89-97
7.	Dynamic Behavior of Silty Soil Layers at Erzincan Eksisu	Erken, A., Yildirim, H., Sancar, T., Kile C. & Ansol, A. M.	1995	Third National Earthquake Engineering Conference, Istanbul	pp.607-614.
8.	PS Logging Method in Determining the Dynamic Soil Properties	Iyison, R. & Ansol, A.	1995	Third National Earthquake Engineering Conference, Istanbul	pp.635-644.
9.	Determination of Dynamic Properties in Geotechnical Engineering by Seismic Methods	Iyison, R. & Ansol, A.	1994	5th National Conf. of Soil Mechanics and Foundation Engng, Ankara, Vol. 1	pp.173-183.
10.	Liquefaction Potential Using In Situ Tests	Erken, A., Ozay, R. & Ulker, R.	1997	4th Turkish National Earthquake Engineering Conference, Ankara	pp.88-95.
11.	Liquefaction Potential and Local Soil Condition in Erzincan Eksisu	Erken, A. & Ulker, R.	1996	ITU Research Report	pp.70
12.	Liquefaction Potential and Local Soil Condition in Erzincan Eksisu	Erken, A., Ulker, R., Ozkan, O & Kurtulmaz, E.	1995	3th Turkish National Earthquake Engineering Conference, Istanbul	pp.597-606.

[EER Subcenter - Soil]
(Special Reports)

No.	Title	Date
1.	Geotechnical and Geodynamic Investigation report for Istanbul-Beylikduzu, Pinar Kule Shopping Center	Jan. 1997
2.	Seismic Risk and Design Earthquake Characteristics for TEAS Bursa Combined Cycle Power Plant Site	July 1996
3.	Geotechnical Report for Evaluation of Seismicity and Soil Amplification of the Site for Yapi Kredi Bank Operations Center Complex in Gebze	Nov. 1994
4.	Geotechnical Report for Evaluation of Seismicity, Seismic Risk, Soil Amplification and Design Earthquake for Is Bank Headquarters Site at Levent, Istanbul	Oct.1994

ANNEX - 11

List of Seminar/Symposia held to Exhibit the Results of the Project

1. "First Japan-Turkey Workshop on Earthquake Engineering - Ductility and Strength Concepts in Reinforced Concrete and Microzonation for Geotechnical Hazard" was held as follows

1. Date: March 27 - 29, 1997
2. Place: Maçka Social Center, Istanbul Technical University
3. Organizing Institutes
 - Japan International Cooperation Agency
 - Faculty of Civil Engineering, Istanbul Technical University
 - Building and Earthquake Research Center of Istanbul Technical University
 - Turkish Earthquake Foundation
 - Turkish National Committee on Earthquake Engineering

4. Program

(1) March 27 (Thursday), 1997

1) Opening Session (9:10-9:30)

2) Seminar Session (9:30-13:30)

Speaker	Title
T. Okada	Promotion of Seismic Retrofitting of Buildings
A. Marcellini	State-of-the-Art of Seismic Hazard in Italy
U. Ersoy & G. Özcebe	Moment Curvature Relationship of Confined Concrete
M. Erdik	Earthquake Hazard Assessment for Near Fault Regions
A. Çakiroğlu & F. Karadoğan	Plastic Hinge Capacities, Curvature and Structural Ductilities for RC Structures
A. Rutenberg & M. de Stefano	The Force Reduction Factor and Seismic Stability of Code-Designed Yielding Asymmetric Structures
I. Towhata	Geotechnical Aspect of 1995 Kobe Earthquake and Liquefaction Damages
F. Karadoğan, E. Yüksel & A. İlki	Deformability Limits and Ductility of RC Bare Frames
S. Tezcan & L. Teri	Shear Wave Propagation and Liquefaction in Layered Soils
T. Crespaloni & M. Mougieri	Evaluation of Seismic Damageability of Buildings including Geotechnical Hazard
S. Igarashi	Characteristics of Destructive Near-focal Ground Motions

3) Visit to ITU Campus (14:30-)

- Opening Ceremony of Structural and Earthquake Engineering Laboratory
- Tour to Earthquake Engineering Research Subcenter Laboratories
- Opening and Welcome Cocktail

(2) March 28 (Friday), 1997

1) Seminar Session (9:30-13:00)

Speaker	Title
M. Üzümeri	Use and Abuse of Ductility Concept
F. Vinale	In-situ and Laboratory Experimental Techniques Studied to Assess Soil Properties Relevant to Seismic Microzonation
P. Gülkon & M. Sözen	A Displacement Based Procedure for Determination of Seismic Vulnerability of Buildings
K. Tolaganov	Liquefaction Analyses Based on Stress-Strain Characteristics of Sands
A. Tento	Site Effect Evaluation Considering Soil Parameter Uncertainties
A. İlki, P. Özdemir and T. Fukuta	Complete Stress-Strain Behavior of Confined Concrete under Compression
H. Boduroğlu, P. Özdemir and P. Zahirar	An Experimental Study on Reinforced Concrete Beam-Column Joints
A. Ansal and R. İyşan	Microtremor Studies of Damage Distribution in Dinar
D. Petrovski	Probabilistic Seismic Hazard Analysis Effects on Designed Earthquake Ground Motion Characteristics
Ü. Aldemir, M. Bakioglu, and K. Çiğzoğlu	Prediction of Near-Future Earthquake Excitations
T. Maruyoma, H. Güler, H. M. Nurlu and E. Çoruh	Introduction of the Ongoing Turkish-Japanese Project in Ankara- Installation of a New Strong Motion Network System Having a Function of Real-Time Estimate of Earthquake Disaster
N. Bayülke, E. İnan, N. Koç and Z. Çolakoglu	Earthquake Strong Ground Network of Turkey

1) Workshop Sessions (16:00-18:00)

(3) March 29 (Saturday), 1997

1) Workshop Sessions (9:30-11:30)

2) General Discussions and Closing Ceremony

5. Participants

Eighty (80) persons participated, including lecturers of Japanese experts and Turkish counterparts (ITU and Earthquake Research Institute). Invited lecturers comprised of not only professors of Turkish universities but of professors and researchers of foreign universities and institutes (Italy, Macedonia).

II. "Second Japan-Turkey Workshop - Earthquake Disaster Prevention Research in Turkey" has been planned and prepared as follows. As shown below, more active participation of the EDCVE Subcenter will be anticipated. More practical topics on earthquake engineering are to be presented and discussed compared to the first workshop.

1. Date: February 23 - 25, 1998
2. Place: Istanbul Technical University
3. Organizing Institutes
 - Japan International Cooperation Agency
 - General Directorate of Disaster Affairs of the Ministry of Public Works and Settlement
 - Faculty of Civil Engineering, Istanbul Technical University
 - Building and Earthquake Research Center of Istanbul Technical University
 - Turkish Earthquake Foundation
 - Turkish National Committee on Earthquake Engineering
4. Main Topics
 - 1) Repair and Strengthening of Existing Buildings
 - 2) Prediction of Input Ground Motion and Ground Response
 - 3) Real-time Earthquake Monitoring and Immediate Damage Estimation

III. Other than the above Japan - Turkey Workshop, following seminars were held within each subcenter or each laboratory.

[Joint Seminar]

The seminar on "Earthquake Disaster Prevention Researchs" were held in September 25, 1995 in Istanbul and October 2, 1995 in Ankara. The program is shown below. Participants of 56 in Istanbul, mostly composed of persons from Istanbul Technical University and other universities in Turkey, and 71 in Ankara, mainly consists of the staff of relevant sections of the Ministry of Public Works and Settlement, and the press joined the seminar.

[EDCVE Subcenter]

1. Seminar on "Earthquake Disaster Prevention Researchs"

The Seminar on "Earthquake Disaster Prevention Researchs" was held on August 19-20 in Samsun. The program is shown below. More than 100 persons participated the seminar, including staff for local governments. The seminar was introduced in two newspaper as well. The seminar contribute to higher recognition of the importance of the research and early rescue activities, and to awareness on preparedness against earthquakes.

2. Presentations other than the above seminars

The Subcenter made great efforts to promote the recognition of the importance of the research and early rescue activities, and awareness on preparedness against earthquakes. Presentation were made as shown below.

[EER Subcenter-Structure]

Date	Subject	Presented by	Contributor
12 Dec., 96	Stress-Strain Behavior of Confined Concrete under Compression	A. ilki	A. ilki, P. Özdemir, T. Fukuta
7 Jan., 97	Structural Behavior of Prestressed Hollow Core Slab Elements Subjected to Repeated Loading	F. Karadoğan	F. Karadoğan, E. Yüksel, E. Orakdoğan, A. ilki, A. Eröz
14 Jan., 97	An Experimental Study on Plane Frame with Masonary Wall	E. Yüksel	F. Karadoğan, E. Yüksel
28 Jan., 97	Structural Behavior of Prefabricated Slab Elements - I	A. ilki	F. Karadoğan, E. Yüksel, A. ilki
4 Feb., 97	Microtremor Tests on Buildings	A. Eröz	F. Karadoğan, M. Hayashi, A. Eröz, K. Donmaz, A. Koçak, H. Saruhan, E. Yüksel, A. ilki
18 Feb., 97	An Experimental Study on Prefabricated Column	E. Yüksel	F. Karadoğan, E. Yüksel, A. ilki, H. Saruhan
25 Feb., 97	Structural Behavior of Prefabricated Slab Elements - II	K. Donmaz	F. Karadoğan, E. Yüksel, A. ilki, K. Donmaz
4 Mar., 97	Shear Strength of Short Columns	P. Özdemir	P. Özdemir, H. Boduroğlu

DEPREM ZARARLARININ AZALTILMASI ÇALIŞMALARI

SEMİNER

19-20 AĞUSTOS 1996
SAMSUN

PROGRAM

19 AĞUSTOS 1996 (PAZARTESİ)	20 AĞUSTOS 1996 (SALI)
KAYIT (13.30-14.00)	6. Coğrafi Veri Sisteminde Proje Çalışmaları (10.00-10.25) Sn. Bülent ÖZMEN
1. Açılış Konuşmaları (14.15-15.30) Sayın Oktay ERGÜNAY, (Afet İşleri Genel Müdürü) Sayın Takuo MARYAMA (Japon Uzun Dönem Uzmanı) Sayın Necmettin ÖZTÜRK (Samsun Bayındırlık ve İskan Müdürü)	7. Deprem Zararlarının Azaltılması: Şebeke Sisteminin Tanıtımı I (10.30-10.55) Sn. Engin ÇORUH ve Sn. Hıdeaki KOMIYAMA
2. Proje Tanıtımı (15.30-15.55) Sn. Hüseyin GÜLER	8. 1942 Niksar ve 1943 Ladik Depremlerinin İncelenmesi ve KAFZ daki sismisite (11.00-11.25) Sn. Fikri ÖZTÜRK ve Sn. Salih KARAKISA
Çay Arası (16.00-16.25)	9. Deprem Zararlarının Azaltılması Şebeke Sisteminin Tanıtımı II (11.30-11.55) Sn. Hiroshi Sato ve Sn. Hüseyin GÜLER
3. Altyapı İşaretlerinin Tahmini (16.30-16.55) Sn. Junji KIYONO ve Sn. Ali HÜRATA	Öğle Yemeği (12.15-13.45)
4. Proje Bölgesindeki Mikrotremor Çalışmaları (17.30-17.55) Sn. Adem SOMER ve Sn. Noritoshi GOTO	PANEL (14.00-17.00) "Deprem"
5. Proje Bölgesindeki Depremlerin Algılanma Kapasitesi (17.00-17.25) Sn. Bekir TÜZEL ve Sn. Noritoshi GOTO	Çay Arası (15.30-16.00)
Kokteyl (18.30-21.00)	KAPANIŞ (17.00)

Destekleyen Kuruluş: JICA (Japon Uluslararası İşbirliği Ajansı)

**ISTANBUL SEMINAR
TURKISH-JAPANESE PROJECT ON EARTHQUAKE
DISASTER PREVENTION RESEARCH'S**

Supported by:

Japan International Cooperation Agency,(JICA),
Building and Earthquake Research Center,I.T.U.,
Earthquake Research Department , GDDA.

25/September/1995, Monday

Istanbul Technical University
Conference Room of Civil Engineering Faculty

PROGRAM

- 09:30-10:00 Registration
10:00-10:30 Opening Address by Prof.Yarar & Prof.Maruyama
10:30-10:40 Tea Time
- 10:40-11:25 "CODES WE DON'T WANT TO CRACK"
.....How seismic design and building codes have helped reduce damage
caused by earthquakes
by Prof. TSUNEO OKADA
- 11:25-11:35 Break Time
11:35-12:20 "BUILDING DAMAGE BY THE 1995 HYGOKEN-NANBU
EARTHQUAKE"
by Prof. AKENORI SHIBATA
- 12:20-13:30 Lunch Time
- 13:30-14:15 "GROUND DESTRUCTION DUE TO LIQUEFACTION"
by Prof. KENJI ISHIIHARA
- 14:15-14:20 Tea Time
14:20-15:05 "HUMAN CASUALTIES IN THE 1995 HYGOKEN-NANBU
JAPAN EARTHQUAKE"
by Prof. KEISHI SHIONO
- 15:05-15:20 Break Time
15:20-16:05 "DAMAGE TO CIVIL STRUCTURES IN THE 1995 HYGOKEN-
NANBU EARTHQUAKE"
.....Outlines of damage to lifelines and seismic ground motion analyses.
by Prof. JUNJI KIYONO
- 16:05-16:10 Break Time
16:10-17:20 Presentation about the Project
by Prof. Ansal , Prof. Boduroglu , Prof. Karadoğan
- 18:30- Reception Party in Princess Hotel (Mövenpick)

SEMINAR

ON

"EARTHQUAKE DISASTER PREVENTION RESEARCHES"

OCTOBER 2 ND 1995
ANKARA DEDEMAN HOTEL

PROGRAM

9.30	REGISTRATION
10.00-11.00	OPENING <i>(Mr. OKTAY ERGÜNAY-Prof. HIROMU SHIMA)</i>
11.00-11.30	TEA BREAK
11.30-12.00	GIS & KNOWLEDGE DATABASE CREATION FOR EARTHQUAKE DAMAGE ANALYSIS <i>(H. GÜLER, M. NURLU, B. ÖZMEN)</i>
12.00-12.30	SEISMIC DAMAGE ESTIMATION TO LIFELINE SYSTEMS IN TURKEY <i>(Prof. J. KIYONO)</i>
12.30-14.30	LUNCH
14.30-15.00	THE SEISMOLOGICAL APPROACH FOR TURKISH-JAPANESE PROJECT AREA <i>(Prof. H. SHIMA, B. TÜZEL, F. ÖZTÜRK, S. KARAKISA, A. BÜYÜKSARAC)</i>
15.00-15.30	EARTHQUAKE DETECTION CAPABILITY ANALYSIS BY MEASURING MICROTREMORS <i>(Prof. N. GOTO, A. SÖMER, B. TÜZEL, E. ÇORUĞ)</i>
15.30-16.00	TEA BREAK
16.00-16.30	BUILDING DAMAGE BY THE 1995 HYOOKEN-NANBU EARTHQUAKE <i>(Prof. A. SHIBATA)</i>
16.30-17.00	HUMAN CASUALTIES IN THE 1995 HYOOKEN-NANBU KOBE JAPAN EARTHQUAKE <i>(Prof. K. SHIONO)</i>
17.00-17.30	EARTHQUAKE FATALITIES: PART 1) COMPARISON OF FATALITIES DUE TO PAST EARTHQUAKES IN TURKEY, CHINA AND JAPAN PART 2) HOW DID FATALITY FEATURES CHANGE IF THE 1995 HYOOKEN-NANBU KOBE EARTHQUAKE WOULD OCCUR IN DAYTIME ? <i>(Prof. Y. OHTA)</i>
18.00	RECEPTION

SUPPORTED BY JICA (Japan International Cooperation Agency)

Presentations (EDCVE Subcenter side) in international meetings other than seminars that were organized by JICA

T.Maruyama and Y.Ohta, "Installation of a new strong motion network system having a function of real-time estimates of earthquakes disasters --- The ongoing Turkish-Japanese joint project in Ankara," Earthquake Research In Turkiye, State of the art, September 30 - October 5, 1996, Ankara, Turkey

H.Komiyama, "A time-serial compact presentation of earthquake strong motions for emergency responses during shaking," Earthquake Research in Turkiye, State of the art, September 30 - October 5, 1996, Ankara, Turkey

O.Ergunay and T.Maruyama, "Earthquake observation system for immediate damage estimation," Eight International Conference on Soil Dynamics and Earthquake Engineering, July 20-24, Istanbul, Turkey

R.Yilmaz, H.Guler, and T.Maruyama, "Development of the immediate earthquake information system in Turkey," The international workshop on urban earthquake risk assessment and management, 21-23 October 1977, Beijing, China

2 討議議事録 (R/D) ・ミニッツ (英文)

RECORD OF DISCUSSIONS
BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE REPUBLIC OF TURKEY
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE ESTABLISHMENT OF THE EARTHQUAKE DISASTER PREVENTION REASERCH CENTER
IN THE REPUBLIC OF TURKEY

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Yutaka Ohta, Professor of the Earthquake Research Institute, the University of Tokyo, visited the Republic of Turkey from March 11 to 19, 1993, for the purpose of working out the details of the technical cooperation program concerning the Establishment of the Earthquake Disaster Prevention Research Center (hereinafter referred to as "the Project") in the Republic of Turkey.

During its stay in the Republic of Turkey, the Team exchanged views and had a series of discussions with the Turkish authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the Project.

As a result of the discussions, the Team and the Turkish authorities concerned agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

ANKARA, March 18, 1993

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Dr. Yutaka Ohta
LEADER, IMPLEMENTATION
SURVEY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY
(JICA), JAPAN

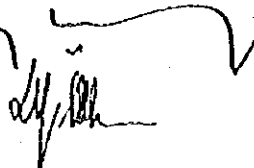
Okuy

Dr. Oktay Ergunay
GENERAL DIRECTOR,
GENERAL DIRECTORATE OF
DISASTER AFFAIRS,
MINISTRY OF PUBLIC WORK
AND SETTLEMENT, THE REPU-
BLIC OF TURKEY

Yayla

Dr. Nadir Yayla for
DEAN, FACULTY OF CIVIL
ENGINEERING,
ISTANBUL TECHNICAL
UNIVERSITY

THE ATTACHED DOCUMENT

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I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of the Republic of Turkey will cooperate with each other in implementing the Project for the purpose of contributing to the reduction of probable earthquake disasters in Turkey.
2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX 1.

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take the necessary measures through JICA to provide at its own expense the services of Japanese experts as listed in ANNEX 2 through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.
2. The Japanese experts referred to in 1. above and their families will be granted in the Republic of Turkey the privileges, exemptions and benefits, as listed in ANNEX 3, no less favourable than those granted to technical assistance experts of third countries or international organizations performing similar missions.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take the necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in ANNEX 4, through the normal procedures under the Technical Cooperation Scheme of Japan.
2. The articles referred to in 1. above will become the property of the Government of the Republic of Turkey upon being delivered Cost, Insurance & Freight (C.I.F.) to the Turkish authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project, following the advice of the Japanese experts referred to in ANNEX 2.

IV. TRAINING OF TURKISH COUNTERPART PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take the necessary measures through JICA to receive at its own expense the Turkish counterpart personnel connected with the Project for technical training in Japan through the normal procedures under the Technical Cooperation Scheme of Japan.
2. The Government of the Republic of Turkey will take the necessary measures to ensure that the knowledge and experience acquired by the Turkish counterpart personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

V. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF TURKEY

1. In accordance with the laws and regulations in force in the Republic of Turkey, the Government of the Republic of Turkey will take the necessary measures to provide at its own expenses :
 - (1) Services of the Turkish counterpart personnel and the administrative personnel as listed in ANNEX 5;
 - (2) Land, buildings and facilities as listed in ANNEX 6;
 - (3) After installation of equipment and system, supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III-1 above ;
 - (4) Transport and travel allowance for the Japanese experts for the official travel within the Republic of Turkey ;
2. In accordance with the laws and regulations in force in the Republic of Turkey, the Government of the Republic of Turkey will take the necessary measures to meet:
 - (1) Expenses necessary for the transportation within the Republic of Turkey of the articles referred to in III-1 above as well as for the installation, operation and maintenance thereof;

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(2) Customs duties, internal taxes and any other charges, imposed in Turkey on the articles referred to in III-1 above;

(3) All recurrent expenses necessary for the implementation of the Project.

VI. ADMINISTRATION OF THE PROJECT

1. The General Director of Disaster Affairs, as head of the project, will bear overall responsibility for the implementation of the Project, and will be responsible for the administrative and managerial matters of the Project.
2. The Japanese Chief Advisor will provide necessary recommendation and advice to the Head of the Project on technical and administrative matters concerning the implementation of the Project.
3. The Japanese experts will give necessary technical guidance and advice to the Turkish counterpart personnel on matters pertaining to the implementation of the Project.
4. For the effective and successful implementation of the Project, a Joint Committee will be established with the function and composition as referred to in ANNEX 7.

VII. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Republic of Turkey undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Turkey except for those arising from willful misconduct or gross negligence by the Japanese experts.

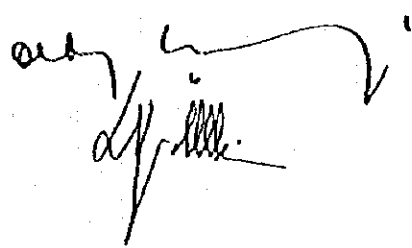
VIII. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this attached Document.

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IX. TERMS OF COOPERATION

The duration of the technical cooperation for the Project under this Document will be five (5) years from April 1, 1993.

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(EDCVE Subcenter)

- 1) Temporal Seismic Observation and Seismicity Data Analysis
- 2) Designing and Construction of Experimental System on Earthquake Strong Motion Observation
- 3) Assessment of Earthquake Elements and Seismic Intensities
- 4) Data Processing on Earthquake Strong Motion Records
- 5) Earthquake Damage Analysis and Vulnerability Evaluation
- 6) Upgrading of Earthquake Strong Motion Observation System

(EER Subcenter)

- 1) Test of Structural Models by Displacement-Controlled Actuator System
- 2) Elucidation of Vibrational Characteristics of Existing Buildings by Microtremor Measurements
- 3) Laboratory Cyclic Test of soils
- 4) In-Situ Test of Soils and Grounds

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ANNEX I
MASTER PLAN

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1. Objectives of the Project:

The Objectives of the Project are to study systematically, develop and improve technologies and techniques for earthquake disaster prevention and mitigation through joint research activities in the Earthquake Disaster Prevention Research Center (hereinafter referred to as EDPRC). EDPRC will be composed of the Earthquake Data Collection and Vulnerability Evaluation Subcenter, the Training and Education Subcenter at the Earthquake Research Department of the General Directorate of Disaster Affairs under the Ministry of Public Works and Settlement, and the Earthquake Engineering Research Subcenter at the Faculty of Civil Engineering, Istanbul Technical University.

1-1 Earthquake Data Collection and Vulnerability Evaluation Subcenter
(hereinafter referred to as EDCVE Subcenter)

The objective of the EDCVE Subcenter is to construct experimentally an intelligent earthquake strong motion observation network in East Turkey, and to accumulate the fundamental data and knowledge on earthquake environment and on earthquake damage evaluation for a better initiation of emergency responses and for reduction of casualties in earthquakes in the future.

1-2 Earthquake Engineering Research Subcenter
(hereinafter referred to as EER Subcenter)

The objective of the EER Subcenter is to accumulate the fundamental data and knowledge on the improvement of the retrofitting techniques and the seismic code, through performing the various types of laboratory and field tests for structures and soils.

NOTE: The Training Education Subcenter is out of the scope of the Japanese technical cooperation.

2. Component Activities of the Project

To achieve the objectives of the Project, the Project will be implemented respectively through the following component activities in each Subcenter.

ANNEX 2

JAPANESE EXPERTS

1. Chief Advisor
2. Coordinator
3. Experts ; Long and / or Short Term Experts will be dispatched in the following fields,

(EDCVE Subcenter)

- 1) Earthquake Strong Motion Observation System
- 2) Seismic Observation and Seismicity
- 3) System Installation
- 4) Seismic Source and Intensities
- 5) Earthquake Strong Motion Records
- 6) Earthquake Damage and Vulnerability
- 7) System Development

(EER Subcenter)

- 1) Installation of Actuator System
- 2) Structural Test by Actuator System
- 3) Microtremor Measurement and Analysis
- 4) Laboratory Test of soils
- 5) In-Situ Test of Soils
- 6) Improvement of Retrofitting Techniques & Seismic Code
- 7) Earthquake Engineering Research

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ANNEX 3.

PRIVILEGES, EXEMPTIONS AND BENEFITS FOR JAPANESE EXPERTS

1. Exemption from income tax and charges of any kind imposed on or in connection with the living allowance remitted from abroad.
2. Exemption from import and export duties and other charges in respect of personal and household effects, including motor vehicles, which may be brought from abroad into the Republic of Turkey.

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ANNEX 4.

LIST OF THE MACHINERY AND EQUIPMENT

(EDCVE Subcenter)

1. Earthquake Strong Motion Observation Systems for local stations
2. Regional Station System at Erzurum
3. Central Station System at Ankara
4. Temporary Seismic Observation System

(EER Subcenter)

1. A Complete Portable With-Multi-Channel-Set of Microtremor Measurement Equipment
2. Low Cycle Displacement-Controlled Actuators System
3. Oil Jacks
4. Measuring Equipments
5. Dynamic Soil Testing Systems
6. In-Situ Soil Testing Systems

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ANNEX 5.

TURKISH COUNTERPART AND ADMINISTRATIVE PERSONNEL

1. Head of the Project

General Director; General Directorate of the Disaster Affairs,
Ministry of Public Works and Settlement

2. Chief Advisor ; Emeritus Prof., Dr. Rifat Yarar

3. Counterpart Personnel shall be assigned in the following fields :

(EDCVE Subcenter)

- 1) Chief of Subcenter
- 2) Seismic Observation and Seismicity
- 3) Earthquake Strong Motion Observation System
- 4) System Installation
- 5) Seismic Source and Intensities
- 6) Earthquake Strong Motion Records
- 7) Earthquake Damage and Vulnerability
- 8) System Development

(EER Subcenter)

- 1) Chief of Subcenter; Director of Building and Earthquake Research Center in ITU
- 2) Installation of Actuator System
- 3) Structural Test by Actuator System
- 4) Microtremor Measurement and Analysis
- 5) Laboratory Test of soils
- 6) In-Situ Test of Soils

4. Administrative Personnel

- 1) Administration Staff
- 2) Accounting Staff
- 3) Bilingual Secretaries (Turkish and English)
- 4) Other necessary supporting Staff

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ANNEX 6.

LIST OF LAND, BUILDINGS AND FACILITIES

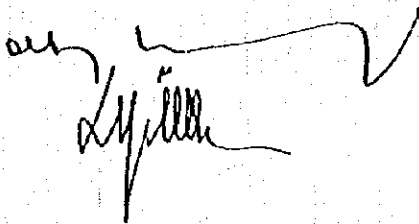
(EDCVE Subcenter)

- 1) One (1) Ordinary Office for Project Administration at the Earthquake Research Department
- 2) One (1) Operation Room and one (1) Study Room at the Central Station
- 3) One (1) Operation Room and one (1) Supplementary Room at the Regional Station (Erzurum)
- 4) Observation Sheds for each Local Station

(EER Subcenter)

For Actuator system

- 1) One (1) Ordinary Office for Japanese Experts
- 2) A Shed to install a Pressure-oil Tank (next to the Laboratory)
- 3) A Crane
- 4) A Power Source
- 5) Test Materials
- 6) A Reaction Frame and a set of Attachments for Loading and Measurement (Plates and bolts)

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ANNEX 7.

JOINT COMMITTEE

1. Functions

The Joint Committee will meet at least once a year and whenever the need arises, and work :

- (1) To formulate the Annual Work Plan of the Project under the framework of this Record of Discussions ;
- (2) To review the overall progress of the technical cooperation program as well as the achievement of the above-mentioned Annual Work Plan ;
- (3) To review and exchange views on major issues arising from or in connection with the technical cooperation program.

2. Composition

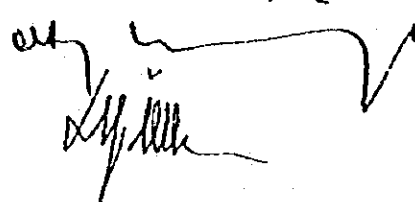
(1) Turkish Side

- (a) Chairman : The General Director of Disaster Affairs,
Ministry of Public Works and Settlement
- (b) Chief Advisor: Emeritus Prof., Dr. Rifat Yarar
- (c) Members : Representatives from EDCVE Subcenter
Representatives from EER Subcenter

(2) Japanese Side :

- (a) Chief Advisor
- (b) Coordinator
- (c) Other experts and personnel concerned, to be dispatched by JICA, if necessary

Note: Official(s) of the Embassy of Japan may attend the committee sessions as observer(s)

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MINUTES OF UNDERSTANDING
BETWEEN

THE JAPANESE IMPLEMENTATION SURVEY TEAM
AND
THE AUTHORITIES CONCERNED OF THE REPUBLIC OF TURKEY

ON
THE JAPANESE TECHNICAL COOPERATION

FOR
THE ESTABLISHMENT OF AN EARTHQUAKE DISASTER
PREVENTION RESEARCH CENTER
IN
THE REPUBLIC OF THE TURKEY

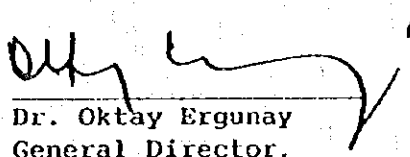
The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as JICA) and headed by Dr. Yutaka Ohta, Professor of the Earthquake Research Institute, the University of Tokyo visited the Republic of Turkey from March 11 to 19, 1993, and had a series of discussions with the Ministry of Public Works and Settlement and other Authorities concerned, for the purpose of concluding the Record of Discussions on the Technical Cooperation for the Establishment of An Earthquake Disaster Prevention Research Center (hereinafter referred to as "the Project") in the Republic of Turkey.

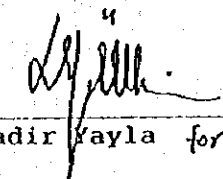
In addition to the Record of Discussions, both the Team and the Turkish authorities agreed to recommend to their respective Governments the following matters.

Ankara, March 18, 1993

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Dr. Yutaka Ohta
Leader,
Implementation
Survey Team,
Japan International
Cooperation Agency
(JICA), Japan


Dr. Oktay Ergunay
General Director,
General Directorate
of Disaster Affairs,
Ministry of Public
Works and Settle-
ment, The Republic of
Turkey

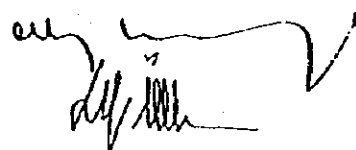

Dr. Nadir Yayla for
Dean,
Faculty of Civil Engi-
neering,
Istanbul Technical
University

1. AIMS OF JAPANESE TECHNICAL COOPERATION

In Turkey there are a large number of poorly constructed rural dwellings which are located in seismically active zones and susceptible to extensive damage during an earthquake. These dwellings are usually constructed from brick masonry or inadequately designed and fabricated reinforced concrete. Due, in part to their less developed socio-economic setting, number of people in Eastern Turkey are facing the highest risks from earthquakes. In consideration of this, the Japanese Technical cooperation will aim to achieve the following through the implementation of the project: -

To assist in the experimental construction and operation of an Earthquake Strong Motion Observation Network with several local stations and one regional station at Erzurum in Eastern Turkey, having one center station at Ankara, in regarded data-processing, and in training the counterpart personnel in network operation and data-analysis techniques. Through such technical cooperation, essential knowledge and technology for the rapid assessment of earthquake characteristics, probable damage features, and consequently for upgrading emergency responses immediately after an earthquake will be accumulated in order to reduce the seriousness of earthquake damage and casualties.

To assist in setting up the displacement-controlled actuator system, and training the counterpart personnel in experimental techniques. Through this collaboration the seismic behavior of brick masonry and poorly reinforced concrete housing is going to be studied, and repair and strengthening technology will be developed through analytical and experimental techniques. New technical standards for seismic design and construction of houses will be established in the future.

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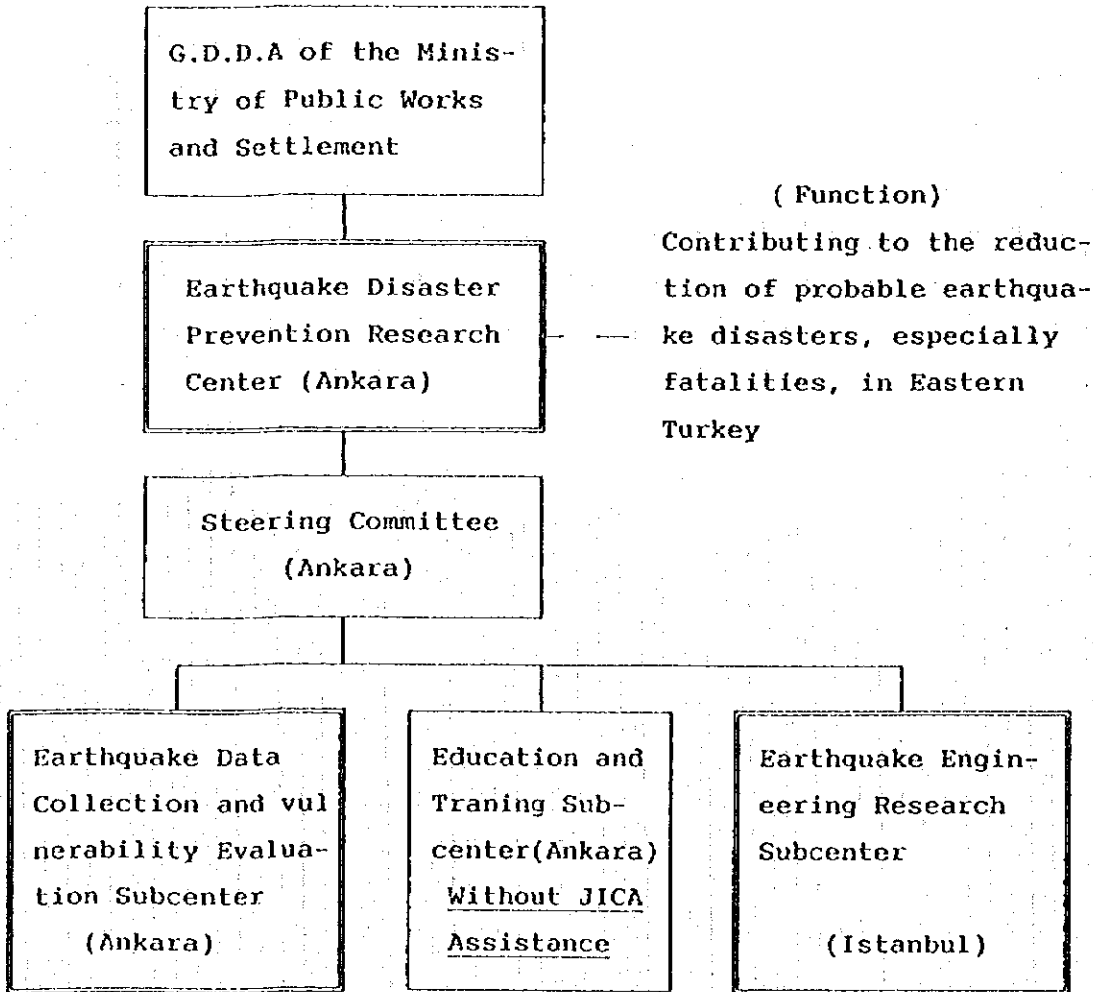
In the field of geotechnical engineering, the proposed project foreseen to be initiated would include cyclic testing of soils under various loading conditions to estimate the dynamic strength and stress-strain properties of soils. The laboratory tests would be complemented with the in-situ tests, utilizing Dutch Cone penetration and seismic field tests.

The Training Education Subcenter will be established by Turkish effort. The activities of this Subcenter will benefit from the activities of subcenters EDCVE and EER. The purpose is to educate engineers, designers, as well as contractors, builders and general public. Seminars and short-courses will be organized, films, videoclips, posters and writings will be produced by this center.

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2. ORGANIZATION AND FUNCTIONS OF THE EARTHQUAKE DISASTER PREVENTION RESEARCH CENTER

The organization and functions of the Earthquake Disaster Prevention Research Center (EDPRC) are shown as follows:



(Function)

Contributing to the reduction of probable earthquake disasters, especially fatalities, in Eastern Turkey

(Function) · Accumulation of earthquake strong motion records
 · Accumulation of data and knowledge on earthquake damage evaluation for the improved initiation of emergency responses

(Function) · Education and training of persons in charge of disaster prevention
 · Dissemination of knowledge on disaster prevention

(Function)
 · Accumulation of experimental techniques and knowledge for the upgrading of structural performance against earthquake

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3. TENTATIVE SCHEDULE OF IMPLEMENTATION OF THE PROJECT

The Tentative Schedule of Implementation has been formulated as ANNEX-A in line with the Attached Document of the Record of Discussions signed between the Team and the Turkish authorities concerned with the implementation of the Project. The schedule is subject to change within the framework of the Record of Discussions when the necessity arises in the course of implementation.

4. PROJECT PLANNING MATRIX OF THE PROJECT

The Preliminary Project Planning Matrix has been prepared as ANNEX-B in line with the Attached Document of the Record of Discussions signed between the Team and the Turkish Authorities concerned. The Matrix shall be completed after detailed examination by both sides at an early stage of the Project, and shall be utilized for monitoring and evaluation of the Project.

5. MUTUAL CONSULTATION BETWEEN JAPANESE EXPERTS AND TURKISH COUNTERPART PERSONNEL

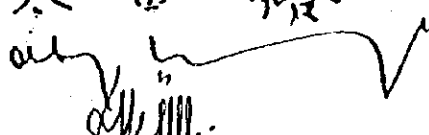
For the smooth implementation of the Project, Japanese experts and Turkish counterpart personnel shall consult each other on decisions-making issues including the selection of candidates for counterpart training in Japan, the preparation of the request forms (A-4) for machinery and equipment provision by JICA, etc.

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OHDA YOSHIYUKI

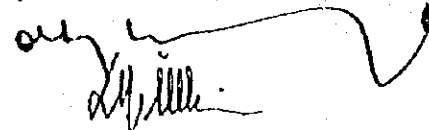
ANNEX-A

<TENTATIVE SCHEDULE FOR THE IMPLEMENTATION OF THE PROJECT>

	1993	1994	1995	1996	1997	1998
TERM OF COOPERATION	-----					
A C T I V I T I E S						
<EDCVE Subcenter>						
1. Temporal Seismic Observation & Seismic Data Analysis	-----					
2. Design & Construction of Earthquake Strong Motion Observation system	-----					
3. Assessment of Earthquake Elements & Seismic Intensities			-----			
4. Data Processing of Earthquake Strong Motion Records				-----		
5. Earthquake Damage Analysis & Vulnerability Evaluation				-----		
6. Upgrading of Earthquake Strong Motion Observation System				-----		
<EER Subcenter>						
1. Testing of Structural Models by Displacement-Controlled Actuator System		-----				
2. Elucidation of Vibrational Characteristics of Existing Buildings by Microtremore Measurement		-----				
3. Laboratory Cyclic Testing of Soils		-----				
4. In-situ Testing of Soils & Grounds		-----				
5. Improvement of Retrofitting Technique & Seismic Code				-----		
TURKISH INPUT						
1. ASSIGNMENT OF COUNTERPART PERSONNEL	-----					
2. PROVISION OF LAND, BUILDING & FACILITIES	-----					
3. PROVISION OF OPERATING EXPENSES	-----					

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	1993	1994	1995	1996	1997	1998
JAPANESE INPUT						
1. DISPATCH OF JAPANESE EXPERTS						
a. Long Term Experts						
1) Leader						
2) Coordinator						
3) Earthquake Strong Motion Observation System						
4) Earthquake Engineering Research						
b. Short Term Experts (EDCVE Subcenter)						
1) Seismic Observation and Seismicity						
2) Earthquake Strong Motion Observation System						
3) System Installation						
4) Seismic Source and Intensities						
5) Earthquake Strong Motion Records						
6) Earthquake Damage and Vulnerability						
7) System Development						
(EER Subcenter)						
1) Installation of Actuator System						
2) Structural Test by Actuator System						
3) Microtremor Measurement and Analysis						
4) Laboratory Test of Soils						
5) In-situ Test of Soils						
(An appropriate number may be dispatched in each field, according to the schedule of activities, over the 5 year period.)						
2. TRAINING OF TURKISH COUNTERPART PERSONNEL IN JAPAN						
(Number of counterpart personnel accepted per year is subject to change due to budget condition.)						
(EDCVE Subcenter)						
1) Earthquake Strong Motion Observation System & Study	--	--	--	--	--	
(EER Subcenter)						
1) Actuator System	--	--	--	--	--	
2) Structural Engineering	--	--	--	--	--	
3) Laboratory Test of Soils		--				
3. PROVISION OF EQUIPMENT						
a. Main Equipment						
b. Spareparts, etc., if necessary						

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3 計画打合せ調査ミニッツ (英文)

THE MINUTES OF DISCUSSIONS
BETWEEN
THE JAPANESE CONSULTATION TEAM
AND THE AUTHORITIES CONCERNED
OF THE GOVERNMENT OF THE REPUBLIC OF TURKEY
ON THE TECHNICAL COOPERATION
FOR THE EARTHQUAKE DISASTER PREVENTION RESEARCH CENTER
IN THE REPUBLIC OF TURKEY

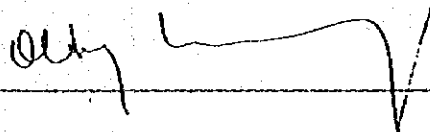
The Japanese Consultation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (JICA) headed by Prof. Dr. Yutaka Ohta visited the Republic of Turkey from June 27 to July 2, 1994 for the purpose of discussing the implementation of the Project for the Earthquake Disaster Prevention Research Center (hereinafter referred to as "the Project") in the Republic of Turkey.

During its stay in the Republic of Turkey, the Team exchanged views and had a series of discussions with the Turkish authorities concerned.

As a result of the discussions, both the Team and the Turkish side came to the understanding concerning the matters referred to in the document attached hereto.

Ankara, July 1, 1994

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Prof. Dr. Yutaka OHTA
Leader
Japanese Consultation Team
The Japan International
Cooperation Agency
Japan

Dr. Oktay ERGÜNAY
General Director
General Directorate of Disaster Affairs
Ministry of Public Works and Settlement
Republic of Turkey

THE ATTACHED DOCUMENT

I. Location of the Regional Station

The Team and the Turkish side agreed that for technical reasons, the regional station of the experimental Earthquake Strong Motion Observation Network will be set up in SAMSUN, instead of having one in Erzurum as was agreed upon in ANNEX 4 of the Record of Discussions and in the Minutes of Understanding both signed in Ankara on March 18, 1993.

II. Location of the Local Stations

The team and the Turkish side also agreed that the cities/towns which are regarded as prospective candidates where local stations can be constructed are named as follows:

- | | |
|--------------|---------------|
| 1. SAMSUN | 7. TOKAT |
| 2. KASTAMONU | 8. Boyabat |
| 3. ÇANKIRI | 9. Vezirköprü |
| 4. ÇORUM | 10. Niksar |
| 5. YOZGAT | |
| 6. AMASYA | |

It was agreed that a further study from technical points of view will be done concerning those candidate places mentioned above, and that out of those above-listed places eight most suitable cities/towns to locate the local stations in will finally be selected and agreed upon when a Japanese Mutual Consultation Survey Team is dispatched to Turkey later this year.

III. It was understood that the relocating of the regional station and the local stations of the experimental Earthquake Strong Motion Observation Network as was agreed upon in article I. above will not alter the objectives and the component activities of the Project or any other matters prescribed in the Record of Discussions signed in Ankara on March 18, 1993.

IV. The list of participants in the meetings appears in the ANNEX.

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LIST OF PARTICIPANTS

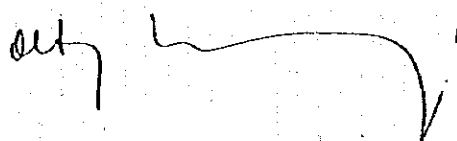
A. Turkish Side

1. Dr. O. ERGÜNAY, General Director, General Directorate of Disaster Affairs,
Ministry of Public Works and Settlement
2. Mr. S. GENÇOĞLU, Head of Earthquake Research Dept., ditto
3. Mr. R. YILMAZ, Deputy Head of Earthquake Research Dept., ditto
4. Mr. H. GÜLER, Director of Laboratory Division, Earthquake Research Dept., ditto

B. Japanese Side

1. Prof.Dr. Y. OHTA, Leader, Japanese Consultation Team, JICA
2. Mr. T. TAKANO, Member, Japanese Consultation Team, JICA
3. Prof.Dr. H. SHIMA, Team Leader, Long-term Expert
4. Mr. H. SATO, Coordinator, Long-term Expert
5. Mr. M. SAKAMOTO, Second Secretary, Embassy of Japan (Observer)

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**THE MINUTES OF MEETING BETWEEN
THE JAPANESE TECHNICAL CONSULTATION TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE REPUBLIC OF TURKEY
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE ESTABLISHMENT OF THE EARTHQUAKE DISASTER PREVENTION
RESEARCH CENTER IN THE REPUBLIC OF TURKEY**

The Japanese Technical Consultation Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency and headed by Dr. Yukata Ohta visited the Republic of Turkey and had a series of meetings with the Turkish Authorities concerned of the Government of the Republic of Turkey (hereinafter referred to as "Turkish authorities concerned") on the implementation of the Technical Cooperation for the Establishment of the Earthquake Disaster Prevention Research Center (hereinafter referred to as "the Project") and on the future perspectives of the Project.

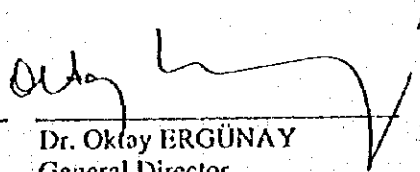
During its stay in the Republic of Turkey, the Team observed the project sites and had a series of discussions with the Turkish authorities concerned in respect of the Project activities.

As a result of the survey and discussions, both sides agreed to refer the matters indicated in the document attached hereto to the respective governments.

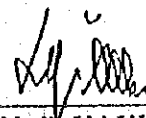
Ankara, Aug. 8, 1994

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Dr. Yutaka OHTA
Leader
Technical
Consultation Team,
Japan International
Cooperation Agency
Japan



Dr. Oktay ERGÜNAY
General Director
General Directorate
of Disaster Affairs,
Ministry of Public
Works and Settlement,
Republic of Turkey



Dr. Nadir YAYLA for
Dean
Faculty of Civil
Engineering,
Istanbul Technical
University,
Republic of Turkey

ATTACHED SHEET

1. ESTABLISHMENT OF THE ORGANIZATION OF EACH SUBCENTER

Both sides agreed that it is important to establish both the Earthquake Data Collection and Vulnerability Evaluation Subcenter (hereinafter referred to as the "EDCVE Subcenter") and the Earthquake Engineering Research Subcenter (hereinafter referred to as the "EER Subcenter") as an organization for the further development of the Project and to work closely with each other to maximize the achievements attained through the Project.

2. COUNTERPART PERSONNEL

Both sides agreed upon the assignment of necessary counterpart personnel corresponding to each of the fields as in ANNEX I.

(EDCVE Subcenter)

The Turkish side stated that assignments will be realized on due time throughout course of the Project.

(EER Subcenter)

The Turkish side stated that assignment will be realized by the end of October, 1994.

3. ACTIVITIES

Both sides discussed the details of activities at each subcenter necessary for the successful implementation of the Project and agreed upon the Plan of Operation as in ANNEX II.



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4. BUDGET ALLOCATION

The Team requested the Turkish side to allocate sufficient budget for the smooth implementation of the activities mentioned in the Plan of Operation.

(EDCVE Subcenter)

The Turkish side replied that they have applied to the State Planning Office to provide a certain amount of money from The State Budget for the Project for coming 3 years, namely 1995, 1996 and 1997. Since getting the approval of The National Assembly for the budget allocation, the Disaster Fund sources, belonging to the General Directorate of Disaster Affairs, is going to be used for the implementation of the Project. By the budget, all kinds of local costs (such as expenditures for construction of local, regional, and central stations, running and maintenance) necessary for implementing the Project are certain to be covered.

(EER Subcenter)

The Turkish side replied that the necessary budget could be obtained from the organizations such as Turkish Earthquake Foundation, Building and Earthquake Research Center, University Research Fund of Istanbul Technical University, State Planning Office, Turkish Scientific and Technical Research Council, and so on.

5. LOCATION OF THE LOCAL STATIONS OF EDCVE SUBCENTER

The Team and the Turkish side agreed from the technical points of view that the local stations of the experimental Earthquake Strong Motion Observation Network will be set up in the following cities/towns.

SAMSUN, KASTAMONU, ÇORUM, YOZGAT, AMASYA, TOKAT, NIKSAR, VEZIRKÖPRÜ

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6. REVIEW OF THE PROJECT PLANNING MATRIX

After reviewing the project planning matrixes for the EDCVE subcenter and EER subcenter which was stipulated in the Minutes of Meetings signed on March 18, 1993, both sides agreed that the two matrixes will be integrated into one as in ANNEX III.

7. MAINTENANCE OF THE EQUIPMENT DONATED BY JAPANESE SIDE

Both sides agreed that in order to give necessary maintenance to the machinery and the equipment donated by the Japanese Government, the ordinary maintenance should be arranged by the Turkish side.

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RM

OR

COUNTERPART PERSONNEL

(EDCVE Subcenter)

- | | |
|---|--|
| 1. Chief of Subcenter | Director of Laboratory Division
of Earthquake Research Department |
| 2. Seismic Observation
and Seismicity | Two(2) counterparts |
| 3. Earthquake Strong Motion
Observation System | Two(2) counterparts
(3. and 6. will work jointly) |
| 4. System Installation | One(1) counterpart |
| 5. Seismic Source and
Intensities | Three(3) counterparts |
| 6. Earthquake Strong Motion
Records | Two(2) counterparts
(3. and 6. will work jointly) |
| 7. Earthquake Damage and
Vulnerability | Two(2) counterparts |
| 8. System Development | One(1) counterpart |

(EER Subcenter)

- | | |
|---|---|
| 1. Chief of Subcenter | Director of Building and
Earthquake Research Center |
| 2. Installation Of Actuator | -One(1) Chief counterpart
(Member of executing committee of EER Subcenter)
at least two(2) counterparts |
| 3. Structural Test by
Actuator System
(2. and 3. will work jointly) | -One(1) Chief counterpart
(Member of executing committee of EER Subcenter)
at least two(2) counterparts |
| 4. Microtremor Measurement
and Analysis | -One(1) Chief counterpart
(Member of executing committee of EER Subcenter)
at least three(3) counterparts |
| 5. Laboratory Test of Soils | -One(1) Chief counterpart
(Member of executing committee of EER Subcenter)
at least five(5) counterparts |
| 6. In-Site Test of Soils
(5. and 6. will work jointly) | -One(i) Chief counterpart
(Member of executing committee of EER Subcenter)
at least five(5) counterparts |

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PLAN OF OPERATION (EDCVE SUBCENTER)

Subjects of Activities	1993		1994		1995		1996		1997	
	4	10 3	4	10 3	4	10 3	4	10 3	4	10 3
1. TEMPORAL SEISMIC OBSERVATION AND DATA ANALYSIS 1. Observation of seismic weak motions (signal-to-noise ratios) 2. Analyses of observed seismic records 3. Evaluation of seismic activity and environment										
2. DESIGN AND CONSTRUCTION OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Designing and manufacturing of network system 2. Preparatory works and installations 3. Observations and experiment										
3. ANALYSIS OF SEISMIC STRONG MOTIONS AND INTENSITIES 1. Analyses of existing records 2. Data processing and analysis of observed records 3. Prediction and evaluation of seismic strong motions										
4. EARTHQUAKE DAMAGE ANALYSIS AND VULNERABILITY EVALUATION 1. Characterization of ground failures and landslides 2. Elucidation of structural vulnerability characteristics 3. Derivation of earthquake casualty equations										
5. APPLICATION STUDY OF EARTHQUAKE INFORMATION 1. Case studies of post-earthquake responses 2. Studies for intensive applications of earthquake information										
6. UPGRADING OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Reinforcement of hardware subsystems 2. Upgrading of software subsystems 3. Total evaluation for future developments										

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PLAN OF OPERATION (EER SUBCENTER, STRUCTURE)

Theme	Subject	Item	Schedule												Remarks
			1994		1995		1996		1997						
			8	12	4	8	12	4	8	12	4	8	12		
Test of Structural Models by Displacement-Controlled Actuator System	Design and Strengthening Method for Masonry Structure	1. Preliminary loading tests* 2. One story shear wall tests & analysis 3. Two story shear wall tests & Analysis 4. Evaluation on strengthening method													* training for structural tests
Elucidation of Vibrational Characteristics of Existing Buildings by Microtremor Measurements	Fundamental Vibration Constants of Existing Structures	1. Loading test & analysis on RC beam-to-column connections 2. Loading tests & analysis on RC sub-frames with shear walls 3. Loading tests & Analysis of two story RC frame with shear walls 4. Evaluation on structural performance of RC frames & design method 5. Verification test by using one story 3-D RC frame under the 2-D pseudo-dynamic testing technique													* depending on progress of the Project
		1. Measurement of vibration constants of existing buildings 2. Evaluation on structural characteristics of existing building in small vibration level													

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PLAN OF OPERATION (EER SUBCENTER, SOIL)

Items of work	1995			1994			1995			1996			1997		
	4	9	3	4	9	3	4	9	3	4	9	3	4	9	3
1. Transfer of equipments, In-situ test apparatus Lab. Test apparatus				—											
2. Preparation and preliminary tests															
3. In-situ tests for site characterization for various sites															
4. Lab. tests to determine dynamic properties of local soils															
5. Compilation of existing soil boring data															
6. Site-specific motion determination by analysis															
7. Analysis of soil liquefaction and ground failure															
8. Development of microzoning maps for major sites															

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Earthquake Disaster Prevention Center Project
PROJECT PLANNING MATRIX

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>Developing Super Goal * Reduction of earthquake risk in Turkey</p> <p>Developing Goal I. EDCVE Subcenter Time saving for emergency responses by establishing of practical system after an earthquake. II. EER Subcenter Reduction of vulnerability of buildings by the upgrading of structural performance against earthquakes.</p>			<p>I. EDCVE Subcenter 1. To establish the study and the develop of accumulation and transmission system for the supporting measures after an earthquake in accordance with their formation of damage by data analysis. 2. In case of occurring earthquake, to deal with data and effective measures by EDCVE system.</p>
<p>Project Purpose I. EDCVE Subcenter To accumulate knowledge for information system of earthquake; damage analyzing for settlement and personnel II. EER Subcenter To establish experimental systems for improving structural performance against earthquakes.</p>	<p>I. EDCVE Subcenter 1. Each of experimental data and Reports (Papers) II. EER Subcenter 2. Basic documents on retrofitting and strengthening technology and manual commentary 3. Verification of the above technology by applying to existing buildings as examples.</p>	<p>I. EDCVE Subcenter 1. Evaluation for quality of details of Papers 2. pen Seminar II. EER Subcenter 1. Evaluation for quality of details of Papers 2. Open Seminar 3. Measurement of the degree of upgrading in the existing example</p>	<p>I. EDCVE Subcenter 1. To spread the result of study by the EDCVE Subcenter widely to rural region 2. The increase of reliability of expansion of Network by the sufficiently developed and utilized experimental systems II. EER Subcenter 1. To spread the result of study by the ET Subcenter widely to rural region 2. To build houses in accordance with the standards and codes which are prepared utilizing the results of study in EER Subcenter</p>
<p>Results/Outputs I. EDCVE Subcenter 1. As an organization in the EDCPC to establish and manage EDCVE Subcenter, and training people 2. To establish EDCVE system, with several local stations and one regional station at Samsun, having one center station at Ankara, and to establish the groundwork of accumulation system for data analysis techniques of earthquake disasters II. EER Subcenter 1. As an organization in the EDCPC to establish and manage EER Subcenter, and to train people 2. By using each experimental system in the EER Subcenter, accumulation of experimental data on retrofitting and strengthening of buildings</p>	<p>I. EDCVE Subcenter 1. Number of Documents 2. Number of Earthquakes on the data II. EER Subcenter 1. Testing time (hours) with the use of each facility and equipment 2. Number of structural specimens 3. Test-run data of each equipment 4. Numbers of documents</p>	<p>I. EDCVE Subcenter 1. Number of counterparts 2. Network for EDCVE Subcenter System and existence of Organization II. EER Subcenter 1. Evaluation of quality of experiment data, reports and papers 2. Frequency of conducting experiments 3. Agreement between aim of experiment and obtained performance</p>	
<p>Project Activities I. EDCVE Subcenter ① Preparation of EDCVE Subcenter ② Preparing an annual implementation Establishment of Subcenter Installation of Machinery and Equipment 2. Activities of EDCVE Subcenter ③ Temporal Seismic Observation and Seismicity Data Analysis ④ Designing and Construction of Experimental System on Earthquake Strong Motion Observation ⑤ Assessment of Earthquake Elements and Seismic Intensities ⑥ Data Processing on Earthquake Strong Motion Records ⑦ Earthquake Damage Analysis and Vulnerability Evaluation ⑧ Upgrading of Earthquake Strong Motion Observation System II. EER Subcenter 1. Preparation of EER Subcenter ② Preparing an annual implementation Establishment of Subcenter Installation of Machinery and Equipment 2. Activities of EER Subcenter ③ Elucidation of Vibrational Characteristics of Existing Buildings by Microtremor Measurements ④ In-Situ Test of Soils and Grounds ⑤ Laboratory Cyclic Test of Soils ⑥ Test of Structural Models by Displacement Controlled Active System</p>	<p>Pages < Turkish side > I. EDCVE Subcenter 1. Installation place and space EDCVE Subcenter at the Ministry of Public Works and Settlement, Department of Disaster Affairs 2. Installation space for several local stations and one regional station on the earthquake observation system 3. Fix of counterparts 4. Preparation work, Expenses necessary for telephone and Electricity in install EDCVE System II. EER Subcenter 1. Installation place and space EER Subcenter at faculty of Civil Engineering in the Istanbul Technical University 2. Identification of counterparts 3. Providing a Reaction Frame and others, equipment and experimental material described in ANNEX 6. 4. Expenses necessary for managing; telephone and electricity etc. < Japanese side > I. EDCVE Subcenter 1. Supporting material ① Earthquake Strong Motion Observation System for local stations ② Regional Station System at Samsun ③ Central Station System at Ankara ④ Temporary Seismic Observation System 2. Japanese Experts ① Earthquake Strong Observation System ② Seismic Observation and Seismicity ③ System Installation ④ Seismic Source and Intensities ⑤ Earthquake Strong Motion Records ⑥ System Development 3. Counterpart Training 1 - 2 person (1) per year ① Detail of training: Earthquake Strong Motion Observation System & Study II. EER Subcenter 1. Supporting materials ① A complete Portable With Multi Channel Set of Microtremor Measurement Equipment ② Low Cycle Displacement Controlled Active System ③ Oil Jacks ④ Measuring Equipment ⑤ Dynamic Soil Testing System ⑥ In situ Soils Testing Systems 2. Japanese Experts ① Earthquake Engineering Research ② Improvement of Retrofitting Technique & Seismic Code ③ Microtremor Measurement and Analysis ④ Installation of Active System ⑤ Structural Test by Active System ⑥ In Situ Test of Soils ⑦ Laboratory Test of Soils 3. Counterpart Training : 1 - 2 person(s) per year Detail of training : Active system, Structural Engineering, Laboratory and In-Situ Testing of Soils</p>		<p>(PRE-CONDITIONS) 1. Necessary number of counterpart should be assigned. 2. Necessary amount of local cost should be allocated by Turkish side</p>

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THE MINUTES OF MEETING
BETWEEN THE JAPANESE TECHNICAL GUIDANCE TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT
OF THE REPUBLIC OF TURKEY
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE EARTHQUAKE DISASTER PREVENTION RESEARCH
CENTER IN THE REPUBLIC OF TURKEY

The Japanese Technical Guidance Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Yutaka Ohta visited the Republic of Turkey from September 20th to October 4th for the purpose of reviewing the progress of activities as well as discussing the implementation plan for the Earthquake Disaster Prevention Research Center Project (hereinafter referred to as "the Project").

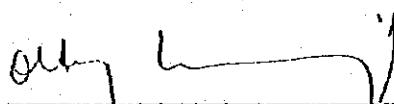
During its stay in the Republic of Turkey, the Team exchanged views and had series of discussions with the Turkish authorities concerned.

As a result of the discussions, both sides agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

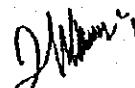
Ankara, October 4, 1995

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Dr. Yutaka OHTA
Leader,
Technical Guidance
Team,
Japan International
Cooperation Agency,
Japan



Dr. Oktay ERGÜNAY
General Director,
General Directorate of
Disaster Affairs,
Ministry of Public Works
and Settlement,
Republic of Turkey



Dr. Nadir YAYLA for
Dean,
Faculty of Civil
Engineering,
Istanbul Technical
University,
Republic of Turkey

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ATTACHED DOCUMENT

1. Review of the Progress

The Team and the Turkish authorities concerned reviewed the progress of the Project activities since its commencement in April 1993, and both sides confirmed it as follows.

(1) Input by Japanese side

a. Dispatch of Experts

In accordance with the Tentative Schedule for the Implementation of the Project (hereinafter referred to as "TSI"), which is ANNEX-A of the MINUTES OF UNDERSTANDING agreed and signed between the Japanese Implementation Survey Team and the Turkish authorities concerned on March 18, 1993, the Japanese side dispatched experts as shown in ANNEX I.

b. Training of Turkish Counterparts in Japan

In accordance with TSI, the Japanese side received Turkish Counterparts for technical training in Japan as shown in ANNEX II.

c. Provision of Equipment

The list of main equipment provided by the Japanese side is shown in ANNEX III.

The provision of the Earthquake Strong Motion Observation System to the Earthquake Data Collection and Vulnerability Evaluation Subcenter (hereinafter referred to as "EDCVE Subcenter") has not been completed as agreed in TSI due to the delay of the implementation caused by the relocation, resulted from technical reasons, of the Regional Center and the Local Stations, that had been discussed by both sides and finally agreed and signed in the RECORD OF DISCUSSIONS and the MINUTES OF MEETING (hereinafter referred to as "the Previous MINUTES OF MEETING") between the Japanese Technical Consultation Team and the Turkish authorities concerned in August 8, 1994.

The provision of equipment for the Earthquake Engineering Research Subcenter (hereinafter referred to as "EER Subcenter") has been proceeded smoothly almost in accordance with TSI.

(2) Input by Turkish side

a. Assignment of Counterpart Personnel

The Turkish side assigned counterpart personnel as shown in ANNEX IV in accordance with the Previous MINUTES OF MEETING.

b. Allocation of Budget

The Turkish side allocated the budget for the Project in its fiscal year 1995 as shown in ANNEX V.

(3) Implemented Activities of the Project

The actually implemented activities of the Project are shown in ANNEX VI in comparison with their original plan agreed in the PLAN OF OPERATION, ANNEX II of the Previous MINUTES OF MEETING.

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2. Implementation Plan of the Project.

The Team and the Turkish authorities concerned discussed the implementation plan for the rest of the cooperation term of the Project (until March, 1998), and both sides confirmed it as follows.

(1) Annual Plan of Operation

The Annual Plan of Operation for the rest of the cooperation term is shown in ANNEX VII.

(2) Measures to be taken by the Japanese side

a. Dispatch of Japanese Experts for 1995

The Team explained that the Japanese side will dispatch Japanese Experts still in the Japanese Fiscal Year (hereinafter referred to as "JFY") 1995 as shown in ANNEX VIII.

b. Dispatch of Japanese Experts for 1996 and 1997

The Turkish side requested the dispatch of Japanese Experts for JFY 1996 and 1997 as shown in ANNEX IX. The Team replied that the Japanese side will make efforts to recruit and dispatch them within the budget.

c. Training of Turkish Counterpart

Both sides agreed the plan of the training of Turkish counterpart personnel in Japan for JFY 1996 and 1997 as shown in ANNEX X.

d. Provision of Equipment for 1995

The Team explained that by the budget of JFY 1995 the provision of the hardware and basic software for the Earthquake Strong Motion Observation System to EDCVE Subcenter is under way and expected to be completed by the end of 1996.

The Team also explained that the provision of Torsional Apparatus to EER Subcenter are expected to be completed by the end of 1996 as well.

e. Provision of Equipment for 1996 and 1997

The Team explained that the provision of equipment for JFY 1996 and 1997 will include the version-up of the software for the Earthquake Strong Motion Observation System. The Turkish side understood it.

(3) Measures to be taken by the Turkish side

Both sides agreed that the Turkish side will provide necessary facilities for the Central Station, Regional Station and Local Stations prior to the completion of the provision of the hardware and basic software for the Earthquake Strong Motion Observation System to EDCVE Subcenter.

Turkish side will make best effort and Japanese Expert will cooperate in their best effort to develop the Region-Specific and Knowledge Database required for the software and its version-up of the Earthquake Strong Motion Observation System.

The development of both Database is expected to be completed by the end of 1996.

3. Others

(1) Periodic Meeting

Both sides agreed that the periodic meeting between the Japanese Experts group and the Turkish counterparts group will be held monthly in the EDCVE Subcenter and trimonthly in the EER Subcenter.

(2) Dissemination Activity

Both sides agreed that in order to promote the Project effectively, intensive publicity activity should be made having seminars, publications and other available means.

Dr. 太田 研

Dr. 太田 浩

ANNEX I

DISPATCH OF JAPANESE EXPERTS

1. Long-Term Experts

FIELD	NAME	PERIOD
EDCVE Subcenter		
a. Chief Advisor	Dr. Hiromu Shima Dr. Takuo Maruyama	1993.7.7 - 1995.10.6 1995.9.8 - 1996.9.3
b. Coordinator	Mr. Hiroshi Sato Mr. Toyohiko Otsuka	1993.6.5 - 1995.6.4 1995.5.18 - 1997.5.17
c. Earthquake Strong Motion Observation System	Dr. Noritoshi Goto	1994.10.5 - 1995.10.31

2. Short-Term Experts

FIELD	NAME	PERIOD
EDCVE Subcenter		
(JFY 1993)		
a. Seismic Observation and Seismicity	Dr. Kazuki Koketsu Dr. Sadaomi Suzuki	1993.7.21 - 1993.8.9 1993.7.8 - 1993.8.27
b. Earthquake Strong Motion Observation System	Mr. Shiko Sugiyama Dr. Yutaka Ohta Dr. Shigeyuki Okada	1993.7.21 - 1993.8.27 1993.7.21 - 1993.8.20 1993.10.17 - 1993.11.12
c. System Installation	Dr. Kazuo Seo	1993.7.21 - 1993.8.9
(JFY 1994)		
a. Seismic Observation and Seismicity	Dr. Kazuo Matsumura Dr. Kazuki Koketsu	1994.7.22 - 1994.8.23 1994.8.2 - 1994.8.28
b. Earthquake Strong Motion Observation System	Dr. Hitomi Murakami Mr. Noboru Ikenishi	1994.7.22 - 1994.8.23 1995.3.4 - 1995.3.29
c. Seismic Source and Intensities	Dr. Hiroshi Takenaka	1994.8.2 - 1994.9.18
d. Earthquake Damage and Vulnerability	Dr. Yoshimasa Kobayashi Dr. Shigeyuki Okada	1994.7.27 - 1994.8.23 1995.2.23 - 1995.3.10

FIELD	NAME	PERIOD
(JFY 1995)		
a. Earthquake Strong Motion Records	Dr. Sadaomi Suzuki	1995.7.28 - 1995.8.23
b. Earthquake Damage and Vulnerability	Dr. Junji Kiyono	1995.7.18 - 1995.10.18
	Dr. Akenori Shibata	1995.9.9 - 1995.10.13
	Dr. Keiji Shiono	1995.9.9 - 1995.10.13
EER Subcenter (JFY 1994)		
a. Installation of Actuator System	Mr. Nobuhiro Imafuku	1995.3.1 - 1995.3.19
b. Microtremor Measurement and Analysis	Mr. Shin Koyama	1994.11.5 - 1994.11.28
c. Test of Soils	Mr. Hidetoshi Miura	1994.9.13 - 1994.10.22
(JFY 1995)		
a. Structural Test by Actuator System	Mr. Toshifumi Fukuta Mr. Nobuhiro Imafuku	1995.6.21 - 1995.7.2 1995.6.21 - 1995.7.2

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ANNEX II

TRAINING OF TURKISH COUNTERPARTS IN JAPAN

1. JFY 1993

FIELD	NAME	PERIOD
(EDCVE Subcenter) a. Earthquake Strong Motion Observation System and Study	Mr. Hüseyin Güler	1993.12.2 - 1994.2.25
(EER Subcenter) a. Actuator System	Mr. Ercan Yüksel	1993.8 - 1994.5
b. Structural Engineering	Dr. Faruk Karadoğan	1993.9.19 - 1993.10.23

2. JFY 1994

FIELD	NAME	PERIOD
(EDCVE Subcenter) a. Disaster Affairs Administration	Dr. Oktay Erugünay	1995.3.8 - 1995.3.18
b. Earthquake Strong Motion Observation System and Study	Mr. Engin Çoruh Mr. Fikri Öztürk	1994.11.27 - 1995.4.25 1994.11.27 - 1995.4.25
(EER Subcenter) a. Laboratory Test of Soils	Dr. Atilla Ansal	1994.11 - 1995.2

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ANNEX III

MAIN EQUIPMENT PROVIDED BY THE JAPANESE SIDE

(EDCVE Subcenter)

1. SEISMIC WEAK MOTIONS OBSERVATION SYSTEM

- (1) Seismometer
- (2) Telemetry Unit
- (3) Power Source Solar System
- (4) Receiver
- (5) Data Acquisition System
- (6) Personal Computer

2. ENGINEERING WORKSTATION

3. SOFTWARE

- (1) PC ARC/INFO
- (2) Arc View
- (3) VGA ERDAS

(EER Subcenter - Structure)

1. SERVO-CONTROLLED ELECTRO HYDRAULIC ACTUATOR SYSTEM

2. HYDRAULIC JACK SYSTEM

- (1) Double Hydraulic Jack
- (2) Center Hole Jack
- (3) Electric Hydraulic Pump
- (4) Hydraulic Jack

3. MICROTREMOMETER SYSTEM

4. DATA RECORDER

5. DATA ANALYSIS SYSTEM

(EER Subcenter - Soil)

1. CONE PENETROMETER MC-CONE SYSTEM

2. SUSPENSION P-S LOGGING SYSTEM

3. BOREHOLE PICK & DATA ACQUISITION SYSTEM

4. DIRECT SHEAR TESTING APPARATUS

5. PNEUMATIC CYCLIC TRIAXIAL TEST APPARATUS

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ASSIGNMENT OF COUNTERPART PERSONNEL

EDCVE SUBCENTER

FIELD	NAME	POSITION	QUALIFICATION
1. Chief of Subcenter	H.Hüseyin GÜLER	Director of Laboratory Division of ERD	Geophysical Engineer, Ms.
2. Seismic Observation and Seismicity	Adem SÖMER Bekir TÜZEL	Laboratory Division of ERD Laboratory Division of ERD	Geophysical Engineer Geophysical Engineer
3. Earthquake Strong Motion Observation System (3. and 6. will work jointly)	Bekir TÜZEL Ali Z. DENİZÖĞLU	Laboratory Division of ERD Seismology Division of ERD	Geophysical Engineer Geophysical Engineer
4. System Installation	Engin ÇORUH	Laboratory Division of ERD	Geological Engineer, Ms.
5. Seismic Source and Intensities	Fikri ÖZTÜRK Adem SÖMER Salih KARAKISA	Laboratory Division of ERD Laboratory Division of ERD Seismology Division of ERD	Geophysical Engineer Geophysical Engineer Geophysical Engineer
6. Earthquake Strong Motion Records (3. and 6. will work jointly)	Fikri ÖZTÜRK Uğur KURAN	Laboratory Division of ERD Laboratory Division of ERD	Geophysical Engineer Geological Engineer, Ms.
7. Earthquake Damage and Vulnerability	Bülent ÖZMEN Ali HÜRATA	Laboratory Division of ERD Earthquake Engineering Division of ERD	Geological Engineer Civil Engineer
8. System Development	Murat NURLU	Laboratory Division of ERD	Geological Engineer, Ms.

ANNEX IV-B

Assignment of Counterpart Personnel

EER SUBCENTER

Field	Name	Position	Qualification
1. Chief of Subcenter	Remzi Ülker	Director of Building and Earthquake Research Center	Prof. Dr.
2. Installation of Actuator (1) Chief Counterpart (2) Counterpart (3) Counterpart	⇒ F. Karadoğan	Director of Structural and Earthquake Engineering Lab.	Prof. Dr.
3. Structural Test by Actuator System & Oil Jack System (2. and 3. will work jointly) (1) Chief Counterpart (2) Counterpart (3) Counterpart	H. Boduroğlu ⇒ E. Yüksel A. İlki ⇒ P. Özdemir A. Eröz 4 Turkish & 2 Foreigner M. Sc. Students	Researcher Teaching and Research Assistant . . .	Prof. Dr.
4. Micro tremor Measurement and Analysis (1) Chief Counterpart (2) Counterpart (3) Counterpart (4) Counterpart	H. Boduroğlu F. Karadoğan A. Ansal E. Yüksel A. Erkem A. İlki A. Eroz P. Özdemir & Graduate Students		Prof. Dr. Prof. Dr. Prof. Dr. Research Ass. Associate Prof. Research Ass. . .
5. Laboratory Test of Soils (1) Chief Counterpart (2) Counterpart (3) Counterpart (4) Counterpart (5) Counterpart (6) Counterpart	A. Ansal A. Erkem ⇒ H. Yıldırım R. İyisan A. Sezen		Prof. Dr. Associate Prof.
6. In-Site Test of Soils (5. and 6. will work jointly) (1) Chief Counterpart (2) Counterpart (3) Counterpart (4) Counterpart (5) Counterpart (6) Counterpart			Ph. D Research Ass.

ANNEX V

BUDGET ALLOCATION BY TURKISH SIDE FOR 1995

1. EDCVE Subcenter

The efforts for allocating State budget to the Project was not successful in 1995. New application has already send, requesting 12 000 000 000.TL from the State budget for the Project activities in the years of 1996, 1997, 1998 is now on process at the State Planning Office (SPO). General Directorate of Disaster Affairs has provided certain amount of money from the Special Disaster Fund to meet the urgent needs of the Project such as salaries, travel allowances and transportation. From January up to the end of September 1995 approximate budget figures for salaries and travel & transportation is shown below.

Salary: 11persons * 9 months * 17 000 000 = 1 700 000 000.TL. (¥ 3 400 000.)

Travel & transportation: 7 travel * 40 000 000 = 280 000 000.TL.(¥ 560 000.)

2. EER Subcenter

The Transactions related to the budget of fiscal year 1995 are listed below:

● Travel allowances	None
● Machinery and Equipment	None
● Materials	100.000.000.-TL
● Improvement of Reaction Frames	148.000.000.-TL
● Improvement of crane ways	44.000.000.-TL
● Telephone and Answering Machine	8.000.000.-TL
● Preparation of T shaped steel specimen	*
● Preparation of reinforced Masonry walls	*
● Cooling device & fans	22.000.000.-TL
● Gas & Electricity expenditure	10.000.000.-TL
● Improvement of the heating system	45.000.000.-TL
● Custom Expenses	14.000.000.-TL
● Certain Amount of office furniture	*
● Salaries of the following positions	*
3 Full Professors	
1 Associate Professor	
1 Assistant Professor	
4 Teaching & Research Assistant	
1 Technician	
● Improvement of existing testing Laboratory	*

* Can not be estimated

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g. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

PLAN OF OPERATION

EDC/VE SUBCENTER	Subjects of Activities	1993		1994		1995		1996		1997	
		4	10 3	4	10 3	4	10 3	4	10 3	4	10 3
1. TEMPORAL SEISMIC OBSERVATION AND DATA ANALYSIS	1. Observation of seismic weak motions (signal-to-noise ratios)										
	2. Analyses of observed seismic records										
	3. Evaluation of seismic activity and environment										
2. DESIGN AND CONSTRUCTION OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM	1. Designing and manufacturing of network system										
	2. Preparatory works and installations										
	3. Observations and experiment										
3. ANALYSIS OF SEISMIC STRONG MOTIONS AND INTENSITIES	1. Analyses of existing records										
	2. Data processing and analysis of observed records										
	3. Prediction and evaluation of seismic strong motions										
4. EARTHQUAKE DAMAGE ANALYSIS AND VULNERABILITY EVALUATION	1. Characterization of ground failures and landslides										
	2. Elucidation of structural vulnerability characteristics										
	3. Derivation of earthquake casualty equations										
5. APPLICATION STUDY OF EARTHQUAKE INFORMATION	1. Case studies of post-earthquake responses										
	2. Studies for intensive applications of earthquake information										
6. UPGRADING OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM	1. Reinforcement of hardware subsystems										
	2. Upgrading of software subsystems										
	3. Total evaluation for future developments										

.....
 Performed
 Planned

② S. A. V. [unclear]

PLAN OF OPERATION

EDCVE SUBCENTER	Subjects of Activities	1993			1994			1995			1996			1997			
		4	10	3	4	10	3	4	10	3	4	10	3	4	10	3	
1. TEMPORAL SEISMIC OBSERVATION AND DATA ANALYSIS 1. Observation of seismic weak motions (signal-to-noise ratios) 2. Analyses of observed seismic records 3. Evaluation of seismic activity and environment																	
2. DESIGN AND CONSTRUCTION OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Designing and manufacturing of network system 2. Preparatory works and installations 3. Observations and experiment																	
3. ANALYSIS OF SEISMIC STRONG MOTIONS AND INTENSITIES 1. Analyses of existing records 2. Data processing and analysis of observed records 3. Prediction and evaluation of seismic strong motions																	
4. EARTHQUAKE DAMAGE ANALYSIS AND VULNERABILITY EVALUATION 1. Characterization of ground failures and landslides 2. Elucidation of structural vulnerability characteristics 3. Derivation of earthquake casualty equations																	
5. APPLICATION STUDY OF EARTHQUAKE INFORMATION 1. Case studies of post-earthquake responses 2. Studies for intensive applications of earthquake information																	
6. UPGRADING OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Reinforcement of hardware subsystems 2. Upgrading of software subsystems 3. Total evaluation for future developments																	

Planned
Updated

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PLAN OF OPERATION
 _____ PLANNED
 _____ PERFORMED

EER Subcenter - Soil

Items of work	1993		1994		1995		1996		1997	
	4	9	3	4	9	10	3	4	9	3
1. Transfer of equipments, In-situ test apparatus Lab. Test apparatus										
2. Preparation and preliminary tests										
3. In-situ tests for site characterization for various sites										
4. Lab. tests to determine dynamic properties of local soils										
5. Compilation of existing soil boring data										
6. Site-specific motion determination by analysis										
7. Analysis of soil liquefaction and ground failure										
8. Development of microzoning maps for major sites										

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9-22

ANNUAL PLAN OF OPERATION ANNEX-VIIA1

EDCVC SUBCENTER

ITEMS OF WORK	REMARKS	SCHEDULE																	
		JFY1995			JFY1996			JFY1997											
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1. TEMPORAL SEISMIC OBSERVATION AND DATA ANALYSIS 1. Observation of seismic weak motions (signal-to-noise ratios) 2. Analysis of observed seismic records 3. Evaluation of seismic activity and environment																			
2. DESIGN AND CONSTRUCTION OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Designing and manufacturing of network system 2. Preparatory works and installations 3. Observations and experiment																			
3. ANALYSIS OF SEISMIC STRONG MOTIONS AND INTENSITIES 1. Analyses of existing records 2. Data processing and analysis of observed records 3. Prediction and evaluation of seismic strong motions																			
4. EARTHQUAKE DAMAGE ANALYSIS AND VULNERABILITY EVALUATION 1. Characterization of ground failures and landslides 2. Elucidation of structural vulnerability 3. Derivation of earthquake casualty equations																			

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ANNUAL PLAN OF OPERATION

ANNEX-VIIA2

EDCVC SUBCENTER	REMARKS	SCHEDULE																	
		JFY1995			JFY1996			JFY1997											
ITEMS OF WORK		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
5. APPLICATION STUDY OF EARTHQUAKE INFORMATION 1. Case studies of post-earthquake responses 2. Studies for intensive applications of earthquake information																			
6. UPGRADING OF EARTHQUAKE STRONG MOTION OBSERVATION SYSTEM 1. Reinforcement of hardware subsystems 2. Upgrading of software subsystems 3. Total evaluation for future developments																			

ANNEX VIII

PLAN OF DISPATCH OF JAPANESE EXPERTS FOR JFY 1995 AS OF OCTOBER 4, 1995

(EDCVE Subcenter)

1. Long-Term Expert

One (1) expert in the field of Hardware System Construction from October, 1995 for two (2) years

2. Short-Term Expert

One (1) expert in the field of Damage Evaluation

One (1) expert in the field of Geographic Information System

One (1) expert in the field of Regional Database

(EER Subcenter)

1. Long-Term Expert

One (1) expert in the field of Dynamic Testing of Soils from January, 1996 for one (1) year.

2. Short-Term Expert

One (1) expert in the field of Liquefaction in January 1996

One (1) expert in the field of Microtremor Measurement in Building in January 1996

伊藤 太田 田村

ANNEX IX

**JAPANESE EXPERTS REQUESTED BY THE TURKISH SIDE
FOR JFY 1996 AND 1997**

(EDCVE Subcenter)

1. Long-Term Expert

One (1) expert in the field of Data Collection and Analysis

2. Short-Term Expert

Three (3) experts in the field of Installation

Three (3) experts in the field of Database Construction

Two (2) experts in the field of Data Collection and Analysis

(EER Subcenter)

1. Long-Term Expert

One (1) expert in the field of Structural Tests and Operation of the Testing System

2. Short-Term Expert

One (1) expert in the field of Microzonation in 1997

One (1) expert in the field of Torsional Testing in 1997

DS *太田 芳*

ANNEX X
TRAINING OF COUNTERPART IN JAPAN FOR JFY 1996 AND 1997

1. JFY 1996

Two (2) counterparts in the field of Earthquake Strong Motion Observation System and Study

One (1) counterpart in the field of Test of Soils

2. JFY 1997

One (1) counterpart in the field of Earthquake Strong Motion Observation System and Study

One (1) counterpart in the field of Structural Tests

One (1) counterpart in the field of Test of Soils

Dr. 太田 洋

5 終了時評価時のプロジェクト・デザイン・マトリックス (PDM) および計画打合せ時のPDM

終了時のPDM

最終目標	プロジェクトの要約	指標	指標データ入手手段	外部条件
<p>地震による死者数が減少する。</p> <p>【上位目標】</p> <ul style="list-style-type: none"> 適切な救助活動が早期に行われる。 改善された建築構造物補修技術が適応される。 改訂された耐震基準が施行される。 <p>【プロジェクト目標】</p> <p>地震被害の防止・減少のための基礎的な技術が普及される。</p>	<p>地震被害の防止・減少についての研究が系統的に実施される。</p> <p>被害評価・予測機能を有する即時 (intelligent) 診断網の実験システムが建設される。</p> <p>地震環境・被害評価に関する基礎的なデータ・知見が普及される。</p> <p>建築構造物の補修および耐震基準に関する基礎的なデータ・知見が普及される。</p> <p>(※防災担当者への訓練が行われる。)</p> <p>(※防災関連知識が普及する。)</p>	<p>地震による死者数</p> <p>救助活動による救済者数</p> <p>補修技術が適用された建築物の数</p> <p>耐震基準に合致する建築物数</p> <p>実験・解析結果に関して発行された文書の量と質</p> <p>実験・解析結果の発表のためのセミナー開催状況</p>	<p>地震記録、被災記録</p> <p>救助活動記録</p> <p>調査、記録</p> <p>査察記録</p> <p>文書リスト</p> <p>文書チェック</p> <p>セミナー開催記録</p>	<ul style="list-style-type: none"> 観測網システムが拡張・改善される。 適用可能な補修技術が開発される。 救援体制が劣化しない。 耐震基準が研究成果に基づき改訂される。 適切な行政指導が行われる。
<p>【活動】</p> <p>(地震防災研究センター)</p> <ul style="list-style-type: none"> 運営委員会・合同委員会の設立・開催 (筑波実験網実験サブセンター) 地震環境の予備的把握 実験システムの設計・設置 実験の諸要素と震度の評価 強度記録・震害の分析 地震被害・被災危険性の評価 地震情報網の応用 (システムの向上) 研究 (地震工学実験サブセンター) 室内構造物実験の実施 既設建築構造物の震動特性の解明 室内土質試験の実施 原位土質調査 	<p>【投入】 (トルコ側)</p> <ol style="list-style-type: none"> 運営委員会・合同委員会の設置 カウンターパート、管理スタッフの配置 研究室・実験室、事務所、観測小屋・処理計器室、反力フレーム・圧力ポンプ用設備の準備 運営予算 (経常経費、供試体作製費等) の確保 (日本側) <ol style="list-style-type: none"> 専門家 (長期・短期)、業務調査員派遣 カウンターパート研修 機材供与 	<p>運営委員会議事録</p> <p>機材活用表</p> <p>文書リスト</p> <p>文書チェック</p> <p>セミナー開催記録</p>	<ul style="list-style-type: none"> カウンターパートが実施機関内に留まる。 	
			<p>前提条件</p> <ul style="list-style-type: none"> 伝送系に相応しい通信回線の利用が可能である (トルコの通信事情にあった伝送系の構築が可能である)。 	

* () 内は教育訓練サブセンターに期待される成果。日本の協力範囲から外されたため、日本側の技術協力から見れば「外部条件」的でもある。

計画打合せ調査時のPDMからの変更点:

- 最終目標、上位目標、成果、および活動についてはR/Dに添付されたマスタープランに基づいて改訂した。
- 計画打合せ時のPDMでは指標に「補修技術の実在建築物への検証例」あげていたが、本プロジェクトでの活動は補修技術の室内実験による検証、実在建築物の振動特性の解明に留まっているため、同指標を除外した。
- 計画打合せ時のPDMでは教育訓練サブセンターの成果を外部条件としていたが、本PDMではプロジェクトに含めている。

Earthquake Disaster Prevention Center Project
PROJECT PLANNING MATRIX

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p>Developing Super Goal • Reduction of earthquake risk in Turkey</p> <p>Developing Goal I. EDCVE Subcenter Time-saving for emergency responses by establishing of practical system after an earthquake. II. EER Subcenter Reduction of vulnerability of buildings by the upgrading of structural performance against earthquakes.</p>			<p>I. EDCVE Subcenter 1. To establish the study and the Develop of accumulation and transmission system for the supporting measures after an earthquake in accordance with their formation of damage by data analysis. 2. In case of occurring earthquake, to deal with data and effective measures by EDCVE system.</p>
<p>Project Purpose I. EDCVE Subcenter To accumulate knowledge for information system of earthquake; damage-analyzing for settlement and personnel II. EER Subcenter To establish experimental systems for improving structural performance against earthquakes.</p>	<p>I. EDCVE Subcenter 1. Each of experimental data and Reports (Papers) II. EER Subcenter 2. Basic documents on retrofiting and strengthening technology and manual commentary 3. Verification of the above technology by applying to existing buildings as examples.</p>	<p>I. EDCVE Subcenter 1. Evaluation for quality of details of Papers 2. pen Seminar II. EER Subcenter 1. Evaluation for quality of details of Papers 2. Open Seminar 3. Measurement of the degree of upgrading in the existing example</p>	<p>I. EDCVE Subcenter 1. To spread the result of study by the EDCVE Subcenter widely to rural region 2. The increase of reliability of expansion of Network by the sufficiently developed and utilized experimental system II. EER Subcenter 1. To spread the result of study by the EER Subcenter widely to rural region 2. To build houses in accordance with the standards and codes which are prepared utilizing the results of study in EER Subcenter</p>
<p>Results/Outputs I. EDCVE Subcenter 1. As an organization in the EDCPC to establish and manage EDCVE Subcenter, and training people 2. To establish EDCVE system, with several local stations and one regional station at Samsun, having one center station at Ankara, and to establish the ground-work of accumulation system for data-analysis techniques of earthquake disasters II. EER Subcenter 1. As an organization in the EDCPC to establish and manage EER Subcenter, and to train people 2. By using each experimental system in the EER Subcenter, accumulation of experimental data on retrofiting and strengthening of buildings</p>	<p>I. EDCVE Subcenter 1. Number of Documents 2. Number of Earthquakes on the data II. EER Subcenter 1. Testing time (hours) with the use of each facility and equipment 2. Number of structural specimens 3. Test-run data of each equipment 4. Numbers of documents</p>	<p>I. EDCVE Subcenter 1. Number of counterparts 2. Network for EDCVE Subcenter System and existence of Organization II. EER Subcenter 1. Evaluation of quality of experimental data, reports and papers 2. Frequency of conducting experiments 3. Agreement between aim of experiment and obtained performance</p>	
<p>Project Activities I. EDCVE Subcenter ① Preparation of EDCVE Subcenter ② Preparing an annual implementation Establishment of Subcenter Installation of Machinery and Equipment 2. Activities of EDCVE Subcenter ③ Temporal Seismic Observation and Seismicity Data Analysis ④ Designing and Construction of Experimental System on Earthquake Strong Motion Observation ⑤ Assessment of Earthquake Elements and Seismic Intensities ⑥ Data Processing on Earthquake Strong Motion Records ⑦ Earthquake Damage Analysis and Vulnerability Evaluation ⑧ Upgrading of Earthquake Strong Motion Observation System II. EER Subcenter 1. Preparation of EER Subcenter ② Preparing an annual implementation Establishment of Subcenter Installation of Machinery and Equipment 2. Activities of EER Subcenter ③ Elucidation of Vibrational Characteristics of Existing Buildings by Microtremor Measurements ④ In-Situ Test of Soils and Grounds ⑤ Laboratory Cyclic Test of Soils ⑥ Test of Structural Models by Displacement-Controlled Actuator System</p>	<p>Inputs < Turkish side > I. EDCVE Subcenter 1. Installation place and space EDCVE Subcenter at the Ministry of Public Works and Settlement, Department of Disaster Affairs 2. Installation space for several local stations and one regional station on the earthquake observation system 3. Fix of counterparts 4. Preparation work, Expenses necessary for telephone and Electricity to install EDCVE System II. EER Subcenter 1. Installation place and space EER Subcenter at faculty of Civil Engineering in the Istanbul Technical University 2. Identification of counterparts 3. Providing a Reaction Frame and others, equipment and experimental material described in ANNEX 6. 4. Expenses necessary for managing; telephone and electricity etc. < Japanese side > I. EDCVE Subcenter 1. Supporting material ③ Earthquake Strong Motion Observation System for local stations ④ Regional Station System at Samsun ⑤ Central Station System at Ankara ⑥ Temporary Seismic Observation System 2. Japanese Experts ③ Earthquake Strong Observation System ④ Seismic Observation and Seismicity ⑤ System Installation ⑥ Seismic Source and Intensities ⑦ Earthquake Strong Motion Records ⑧ System Development 3. Counterpart Training: 1 - 2 person (s) per year ③ Detail of training: Earthquake Strong Motion Observation System & Study II. EER Subcenter 1. Supporting materials ③ A complete Portable With Multi-Channel Set of Microtremor Measurement Equipment ④ Low Cycle Displacement-Controlled Actuator System ⑤ Oil Jacks ⑥ Measuring Equipment ⑦ Dynamic Soil Testing System ⑧ In-situ Soils Testing Systems 2. Japanese Experts ③ Earthquake Engineering Research ④ Improvement of Retrofitting Technique & Seismic Code ⑤ Microtremor Measurement and Analysis ⑥ Installation of Actuator System ⑦ Structural Test by Actuator System ⑧ In-Situ Test of Soils ⑨ Laboratory Test of Soils 3. Counterpart Training: 1 - 2 person(s) per year Detail of training: Actuator system, Structural Engineering, Laboratory and In-Situ Testing of Soils</p>		<p>(PRE-CONDITIONS) 1. Necessary number of counterparts should be assigned. 2. Necessary amount of local cost should be allocated by Turkish side</p>

太田 裕

6 機材活用状況

(終了時評価時点)

機器名	ニーズとの合致	操作技術の移転	維持管理状況	利用頻度
[強震観測網実験サブセンター]				
1. 弱震観測システム	A	A	A	A
2. EWS (Engineering Work Station)	A	A	A	A
3. 強震観測網システム用機材	設置・稼働 試験中	設置・稼働 試験中	設置・稼働 試験中	設置・稼働 試験中
[地震工学実験サブセンター]				
4. 微動計測システム	B	A	A	A
5. アクチュエータ・システム	A	B	B	C
6. 油圧ジャッキ	A	B	A	B
7. 計測システム	A	A	A	A
8. 室内土質試験用機器	B	B	A	B
9. 原位置土質試験用機器	A	A	A	B

ニーズとの合致： A；合致している， B；ほぼ合致， C；基本的には合致 D；合致していない
 操作技術の移転： A；全て移転された， B；ほぼ移転された， C；一部移転された D；移転されていない
 維持管理状況： A；常時良好， B；ほぼ良好， C；時折不良 D；不良
 利用頻度： A；頻繁／必要毎時， B；よく利用， C；時折利用 D；あまり利用されない

7 終了時評価調査表

案 件 名	(和) 地震防災研究センター (英) The Earthquake Disaster Prevention Research Center		
供 与 国	トルコ国		
協力期間 (R/D協定上)	1993年4月1日～1998年3月31日 (5年間)		
事業分野	社会開発協力事業		
技術協力分野	研究開発		
エバリュエーション	(担当)	(氏名)	(所属)
調査団	団長・強震観測	太田 裕	山口大学教授
	土質工学	石原 研而	東京理科大学教授
	耐震構造	福田 俊文	建設省建築研究所実大構造物実験室長
	研究協力	藤原 保幸	建設省住宅局住宅整備課公共住宅事業調整官
	協力企画	前田 英男	JICA社会開発協力部社会開発協力第二課
	評価調査	原 尚生	八千代エンジニアリング株式会社
終了時評価調査実施日	1997年11月3日～1997年11月15日 (13日間)		

評価結果総括	
(1) 目標達成度	<p>目標の達成度はサブセンターによって大きく異なる。強震観測網実験サブセンターについては、プロジェクト目標の主要部分が未だ達成されていないが、予備調査・研究、システム設計・設置準備等を通じ、相応の基礎的データ・知見が蓄積されてはいる。地震工学実験サブセンターについては、予定どおり実験・研究が行われ、かなりの量の基礎的なデータ・知見が蓄積され、プロジェクト目標は概ね達成されたといえるが、今後の被害低減策の確立に向けて考えれば、まだまだ取り組むべき課題はあろう。</p>
(2) 案件の波及効果	<p>プロジェクトの実施により、特に若手のカウンターパートを中心に、高度な専門技術をもつ日本の専門家の指導を受ける機会を与えられ、その研究レベルは格段に向上した。</p>
(3) 自立発展性の見通し	<p>組織的・財政的な自立発展性は得られているが、技術的な自立発展性については十分とはいえない。強震観測網実験サブセンターについて言えば、観測網システムの運営が未だ行われていないため、同システムを維持発展していくための技術的な自立発展性はまだ得られていない。また、地震工学実験サブセンターについては、技術的にかなりの力をつけてきたとはいえるが、成果をさらに発展させ目標達成をより完全とするには更なる協力が好ましい。</p>
(4) フォローアップの必要性	<p>今回の協議により、「プロジェクト活動を今後も継続していく必要がある」ことで合意に達した。強震観測網実験サブセンターについては、技術的な自立発展性を獲得し、プロジェクトの目標を達成すべく協力の継続が好ましい。地震工学サブセンターについては、プロジェクトの範囲となっている研究活動を概ね自力で継続していく能力は持っているものの、さらなる実験活動・データ分析を行い、地震に対する事前対策への貢献を増すためにも、何らかのフォローが好ましい。</p>

1. 協力実施プロセス

<p>1. 要請の内容と背景</p>	<p>トルコ国は地理的に世界の地震ベルト地帯に位置しており今世紀に入ってからでも国の東部を中心に数十回の大規模地震が発生し、多くの生命と財産が失われている。このような状況からトルコ政府は、「地震防災研究センター (EDPRC)」による地震発生後の正確な被害状況把握のためのシステム確立するとともに、地震に弱い既存住宅の耐震性向上について研究を進めることを計画しわが国にプロジェクト方式技術協力を要請してきた。最終的に要請されたプロジェクトの内容は、地震防災サブセンター(強震観測網実験サブセンター、地震工学実験サブセンター、および教育・訓練サブセンターの3つのサブセンターからなる)の設立・運営を通してトルコで多発する地震災害、特に死傷者の発生を低減する方策を確立するための基礎的な貢献を目的とするための実験・研究を実施するものである。3つのサブセンターの内、教育・訓練サブセンターについてはトルコ側の自助努力で設立・運営されこととなり、日本の協力範囲からは外されてはいるものの、3つのサブセンターが三位一体となって全体目的の達成すべく計画されたプロジェクトである。</p>																																																			
<p>2. 協力実施プロセス</p> <p>(1) 要請発出</p> <p>(2) 事前調査 (担当/氏名/所属)</p> <p>(3) 長期調査 (担当/氏名/所属)</p>	<p>1986年12月19日；「構造力学・地震工学研究所（イスタンブール工科大学）」に関するプロジェクト方式技術協力要請。 1987年8月24日；「強震観測・予知システム(アンカラ公共事業省)」に係るプロジェクト方式技術協力要請。 1990年9月20日；「地震防災研究センタープロジェクト」として再要請したい旨の口上書提出。 1991年5月27日；「地震防災研究センタープロジェクト」に係る非公式プロポーザル提出 1991年10月14日「地震防災研究センタープロジェクト」に係る正式プロポーザル提出</p> <p>1992年3月1日～1992年3月15日（15日間）</p> <table border="0"> <tr> <td>総括</td> <td>中村 信</td> <td>JICA 社会開発協力部長</td> </tr> <tr> <td>強震観測</td> <td>太田 裕</td> <td>東京大学地震研究所応用地震学部門教授</td> </tr> <tr> <td>耐震構造</td> <td>室田 達郎</td> <td>建設省建築研究所第三研究部長</td> </tr> <tr> <td>建築基準</td> <td>杉山 義孝</td> <td>建設省住宅局住宅建築課値域住宅計画官</td> </tr> <tr> <td>計画評価</td> <td>松井 英織</td> <td>文部省学術国際局研究助成課庶務係長</td> </tr> <tr> <td>協力企画</td> <td>川上 茂人</td> <td>JICA 社会開発協力部</td> </tr> </table> <p>強震観測分野：1992年11月7日～1992年11月28日（22日間） 耐震工学分野：1992年11月28日～1992年12月11日（14日間）</p> <table border="0"> <tr> <td>強震観測分野</td> <td></td> <td></td> </tr> <tr> <td>強震観測室外実験</td> <td>太田 裕</td> <td>東京大学地震研究所応用地震学部門教授</td> </tr> <tr> <td>地震計測</td> <td>鈴木 慎臣</td> <td>九州大学理学部地球惑星学科助教</td> </tr> <tr> <td>地域データベース</td> <td>岡田 茂幸</td> <td>北海道大学工学部建築工学科助教</td> </tr> <tr> <td>伝送・刻時系</td> <td>杉山 志行</td> <td>明星電気(株) 技術部データ伝送課主任</td> </tr> <tr> <td>技術協力行政</td> <td>原田 秀明</td> <td>外務省経済協力局技術協力課外務事務官</td> </tr> <tr> <td>実施計画</td> <td>永田 邦昭</td> <td>JICA 社会開発協力部第一課職員</td> </tr> <tr> <td>耐震工学分野：</td> <td></td> <td></td> </tr> <tr> <td>耐震工学室内実験</td> <td>岡田 恒男</td> <td>東京大学生産技術研究所教授</td> </tr> <tr> <td>土の実験</td> <td>石原 研爾</td> <td>東京大学工学部土木工学科教授</td> </tr> <tr> <td>耐震実験</td> <td>福田 俊文</td> <td>建設省建築研究所企画部国際研究協力官</td> </tr> </table>	総括	中村 信	JICA 社会開発協力部長	強震観測	太田 裕	東京大学地震研究所応用地震学部門教授	耐震構造	室田 達郎	建設省建築研究所第三研究部長	建築基準	杉山 義孝	建設省住宅局住宅建築課値域住宅計画官	計画評価	松井 英織	文部省学術国際局研究助成課庶務係長	協力企画	川上 茂人	JICA 社会開発協力部	強震観測分野			強震観測室外実験	太田 裕	東京大学地震研究所応用地震学部門教授	地震計測	鈴木 慎臣	九州大学理学部地球惑星学科助教	地域データベース	岡田 茂幸	北海道大学工学部建築工学科助教	伝送・刻時系	杉山 志行	明星電気(株) 技術部データ伝送課主任	技術協力行政	原田 秀明	外務省経済協力局技術協力課外務事務官	実施計画	永田 邦昭	JICA 社会開発協力部第一課職員	耐震工学分野：			耐震工学室内実験	岡田 恒男	東京大学生産技術研究所教授	土の実験	石原 研爾	東京大学工学部土木工学科教授	耐震実験	福田 俊文	建設省建築研究所企画部国際研究協力官
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I. 協力実施プロセス (続き)

<p>(4) 実施協議調査 (担当/氏名/所属)</p>	<p>1993年3月10日～1993年3月20日 (11日間) R/Dの署名・交換1993年3月18日</p> <p>総括・団長 太田 裕 東京大学地震研究所教授 地震計測 久保寺 章 京都大学名誉教授 耐震構造 山内 泰之 建設省建築研究所国際基準研究官 建築行政 沖村 恒雄 建設省住宅局市街地建築課高度利用調整官 研究計画 桑田 悟 文部省学術国際局学術課文部事務官 業務調整 佐藤 博 JICA社会開発協力部社会開発協力第一課</p>
<p>(5) 専門家派遣開始</p>	<p>1993年6月5日 (佐藤 博)</p>
<p>(6) 運営指導専門家派遣 (担当/氏名/所属)</p>	<p>1994年6月26日～1994年7月4日 (9日間)</p> <p>太田 裕 東京大学地震研究所教授 高野 剛 JICA社会開発協力部社会開発協力第二課課長代理</p>
<p>(7) 計画打合せ調査 (担当/氏名/所属)</p>	<p>1994年7月29日～1994年8月11日 (14日間)</p> <p>総括・団長 太田 裕 東京大学地震研究所教授 強震観測 後藤 典俊 室蘭工業大学情報工学科教授 土質 石原 研而 東京大学工学部教授 耐震構造 福田 俊文 建設省建築研究所第4研究部室長 協力企画 橋口 祐子 JICA社会開発協力部社会開発協力第二課</p>
<p>(9) 巡回指導調査 (担当/氏名/所属)</p>	<p>1995年9月20日～1995年10月11日 (21日間)</p> <p>総括・強震観測 太田 裕 山口大学工学部教授 耐震構造 岡田 恒男 東京大学生産技術研究所教授 土質 石原 研而 東京理科大学理工学部土木工学科教授 研究協力 松尾 淳 文部省学術国際局学術課学術企画室調査係長 協力企画 須藤 勝義 JICA社会開発協力部社会開発協力第二課</p>
<p>3. 協力実施過程における特記事項</p>	<p>* 要請当時は2つの案件であったが1つのプロジェクト要請に変更した。 * 当初計画された地震観測網の対象地域の大半が「注意喚起地域」に指定されたため同地域が変更され、観測端末点選定以降の活動が当初計画より遅れた。 * JICAの機材調達制度の変更があり、地震観測網システムのための機材供与以降の活動がさらに遅れた。</p>
<p>4. 他の協力事業との関連性</p>	<p>特になし</p>

II. プロジェクトの実績

	(実施協議時)	(計画打合せ協議、巡回指導時)	(終了時評価時)	(目標達成/未達成の理由)
1. 投入実績	<p>【当初計画】</p> <p>(1) 日本側投入</p> <p>1) 専門家（長期・短期）、業務調整員派遣</p> <p>2) カウンターパート研修</p> <p>3) 機材供与</p> <p>(2) トルコ側投入</p> <p>1) 運営委員会・合同委員会の設営</p> <p>2) カウンターパート、管理スタッフの配置</p> <p>3) 研究室・実験室・事務室・観測小屋・処理計測室・反力フレーム・圧力ポンプ用設備の準備</p> <p>4) 運営予算（経常経費、供試体作製費等）の確保</p>	<p>【計画変更】</p> <p>(1) 日本側投入</p> <p>・観測網システムのための機材供与の日程が変更された。</p> <p>・EWSの供与が前倒しされた。</p> <p>(2) トルコ側投入</p> <p>1) 非公式であったカウンターパートの配置が公式的に行われた。</p> <p>2) 運営予算確保の見通しが確認された。</p>	<p>【投入実績】</p> <p>(1) 日本側投入</p> <p>・強震観測網システムのための機材供与以外は量・質・納期の面ではほぼ計画どおり、もしくは遅れに合わせた投入が行われた。</p> <p>(2) トルコ側投入</p> <p>・運営委員会・合同委員会についてはR/D記載どおりには開催されなかった。</p> <p>・他の投入は概ね計画どおり。</p>	<p>1) クルド人問題による強震観測網対象地域の変更</p> <p>2) JICAの機材調達システムの変更により、観測網システムのための機材供与は2年近くの遅れが生じた（現地納入は1997年7月）。これらの原因はプロジェクトの実施者に起因するものでないと判断される。</p> <p>新運営予算については、政府の緊縮財政政策により通常予算からの割り当てには制約があったが、災害特別基金等の割り当てにより賄われた。</p>
2. 活動実績	<p>【当初計画】</p> <p>本文3-4に示されるとおり、プロジェクトの初年次に、2年次以降に予備実験、機器設置を行い、順次実験を高度化し、後半に解析・評価を実施する工程であった。</p> <p>【活動の前提条件】</p> <p>強震観測網システム伝送系のための適切な通信手段が利用できること（現地の通信事情に適った機器が利用できること）。</p>	<p>【計画変更】</p> <p>強震観測網システムのための機材供与の遅れにより、同システムの設置および以降の活動工程が約1年半、後送りされた。</p> <p>【前提条件の変更、外部状況の変化】</p> <p>公衆デジタル回線（パケット通信、TURPAK）と電話回線が適用可能であると推定された。</p>	<p>【活動実績】</p> <p>・評価時点で強震観測網システムの設置はほぼ終わりつつあり、伝送系を含めた稼働実験が行われていた。（1998年3月のプロジェクト終了時には完了見込み）</p> <p>・各サブセンター間の活動調整が不十分であった。</p> <p>【外部状況の変化】</p> <p>・接続・回線の安定性に問題のある例もあるが、問題は克服されつつある。</p>	<p>投入（機材供与）の遅れにより活動が遅れが生じた。</p>

II. プロジェクトの実績 (続き)

	(実施協議時)	(計画打合せ協議, 巡回指導時)	(終了時評価時)	(目標達成/未達成の理由)
3. 成果	<p>[計画時に期待された成果]</p> <ul style="list-style-type: none"> ・地震被害の防止・減少についての研究が系統的に実施される。 ・被害評価・予測機能を有する即時 (intelligent) 観測網の実験システムが建設される。 ・地震環境・被害評価に関する基礎的なデータ・知見が蓄積される。 ・建築建造物の補修および耐震基準に関する基礎的なデータ・知見が蓄積される。 	<p>[成果に関する変更]</p> <p>(なし)</p>	<ul style="list-style-type: none"> ・活動に応じた成果が見られた。 ・強震観測網システムによる実験が未だ行われていないため、被害評価に関するデータの知見は蓄積されていないが、準備活動を経て観測網設置、地震環境についてのデータは幾分蓄積されてはいる。 ・建築建造物の補修および耐震基準に関する基礎的なデータ・知見についてはかなりの量が蓄積された。 	<p>投入・活動の遅れによる。</p>
	<p>[成果の指標]</p> <ul style="list-style-type: none"> - 運営委員会・合同委員会の意思決定・調整活動 - 実験システムの稼働状況 - 実験・解析結果に関して発行された文書の量と質 - 実験・解析結果の発表のためのセミナー開催状況 	<p>[成果の指標に関する変更]</p> <p>(なし)</p>	<ul style="list-style-type: none"> ・日本人専門家も参加する合同会議は時折開催されたが、進捗報告・情報交換に留まっており、意思決定・調整はほとんど行われていない。 	
	<p>[期待される成果実現のための外部条件]</p> <ul style="list-style-type: none"> ・カウンターパートが実施機関内に留まる。 	<p>[外部条件の変更, 外部状況の変化]</p> <p>(なし)</p>	<p>[外部状況の変化]</p> <ul style="list-style-type: none"> ・カウンターパートは実施機関に留まっており、今後も勤務し続ける見通しである 	

1.1.1. 計画の妥当性 (終了時評価時における計画立案の妥当性)

<p>1. 上位目標の評価時における妥当性</p>	<p>[上位目標]</p> <ul style="list-style-type: none"> 適切な救助活動が早期に行われる。 改善された建築構造物補修技術が適応される。 改訂された耐震基準が施行される。 <p>(妥当性評価)</p> <p>上位目標は、最終目標である「地震による死傷者の減少」を達成するために隘路となっている問題が解消される状態を目的としている。適切な問題分析による目標設定である。</p>
<p>2. プロジェクト目標の評価時における妥当性</p> <ul style="list-style-type: none"> 上位目標との整合性 実施機関組織のニーズとの整合性 	<p>[プロジェクト目標]</p> <ul style="list-style-type: none"> 地震被害の防止・減少のための基礎的な技術が蓄積される。 <p>(妥当性評価)</p> <ul style="list-style-type: none"> 地震多発国であるトルコ国における地震被害の防止・減少のための基礎的な技術に対するニーズは高く、終了時評価時においても、計画時と同様高い。1995年に発生したディナール地震により、同ニーズはさらに高まっているともいえる。 実施機関である公共事業住宅省防災総局地震研究部、イスタンブール工科大学はトルコ国の地震防災研究の中心であり、同国のニーズはそのまま実施機関のニーズでもある。 本案件はトルコの国家地震工学委員会からの長期研究計画の一環として計画された。また、トルコ政府は地震防災を国際防災10年(1990-2000年)における重点項目にあげている。 プロジェクト目標は上位目標を達成のために不可欠な第一ステップである。
<p>3. 上位目標・プロジェクト目標・成果・活動の相互関連性に関する妥当性</p>	<ul style="list-style-type: none"> プロジェクト目標の達成と上位目標の達成には大きなギャップがある。プロジェクト目標達成後も上位目標達成のために満たされなければならない条件は数多くある(終了時のPDMでは本プロジェクトの範囲外として外部条件に置かれている)。これらの1つ1つの外部条件を満たすことを目標とするプロジェクトがそれぞれ成立しうるような大きな問題である。しかし、本プロジェクトは上位目標達成のための第一ステップとして計画されたものであり、上記のギャップは、本計画は妥当でなかったことを示すものではない。 本プロジェクト計画時には技術協力としての妥当性から防災行政に直接関与することは避けられた。本プロジェクト目標の達成を基盤としてトルコ側による防災行政の改善がなされて初めて上位目標が達成されうことは計画当初から認識されていたと考えられる。
<p>4. 計画立案過程の妥当性</p>	<p>事前調査・長期調査等を通じ、要請内容の把握・技術協力としての妥当性・技術的妥当性・現地の自然環境・実施機関の体制等について度重なる協議により計画され、計画過程は適切であったと判断される。</p>
<p>5. 妥当性を欠いた要因 (ニーズの把握状況、相手国実施体制、国内支援体制等の観点から記述)</p>	<ul style="list-style-type: none"> 妥当性を欠いた点は特に見あたらない。 <p>95年1月の神戸の震災により国内地震防災関係者は多忙を極め、専門家(特に長期)派遣にかかる人選等、国内支援は困難に直面したと考えられるが、このことは計画が妥当でなかったことを示すものではない。また、実績から分かるとおり、専門家派遣等は概ねトルコ側のニーズを満たすものであった。</p>

IV. 実施の効率性

1. 投入量と成果の量・質との関連性	<ul style="list-style-type: none"> ・成果の指標に数値目標が与えられなかったため、効率性を数値で示すのは困難であるが、実験結果は膨大な量の文書にまとめられ、セミナーも頻繁に開催されたこと、およびほぼ予定通りの投入が行われたことから、概ね予定された効率で実施されたと考えられる。
2. 最も安価で早い手段がとられたか？	<ul style="list-style-type: none"> ・日本で既に確立している実験手法を中心に行われたため、効率的な手段がとられたと判断できよう。
3. 問題に遭遇したとき、制約のある投入をもって効率的に実施されたか？	<ul style="list-style-type: none"> ・機器の故障等に遭遇した際にも適切な代替手段を講じた。 ・観測網システムの機材納入が遅れる中でも、EWSが前倒しで供与し、データベースの構築を図る等、適切な処置がとられた。

V. 目標達成度

	(実施協議時)	(中間評価時)	(終了時評価時)	(目標達成/未達成の理由)
1. プロジェクト目標の達成状況 (見込み)	<p>【当初目標】 ・地震被害の防止・減少のための基礎的な技術が蓄積される。</p> <p>【目標達成の指標】 - 実験・解析結果に関して発行された文書の量と質 - 実験・解析結果の発表のためのセミナー開催状況</p>	<p>【目標】 (変更なし)</p> <p>【目標達成の指標】 (変更なし)</p>	<p>【目標達成状況】 ・地震環境・被害評価に関する基礎的なデータ・知見が十分に蓄積されなかった。 ・その他の面ではかなりの量の基礎的なデータ・知見が十分に蓄積された。</p>	<p>・投入の遅れとそれに起因する活動の遅れにより、重要な成果が達成されなかったことによる。</p>
2. 目標の達成状況と上位目標達成状況の関連性	<p>【目標達成への外部条件】 重要な外部条件はなし</p>	<p>【目標達成への外部条件】 (変更なし)</p>	<p>【外部条件の変化の有無】 (なし)</p>	<p>【目標達成が上位目標達成に結びつかなかった理由】 ・目標の重要な一部が未だ達成されていない。 ・「計画の妥当性」の項で述べられているように本プロジェクト目標が達成されたからといって直ぐに上位目標に結びつくような性質の計画ではない。</p>
	<p>【当初上位目標】 ・適切な救助活動が早期に行われる。 ・改善された建築構造物補修技術が適用される。 ・改訂された耐震基準が施行される。</p> <p>【上位目標達成の指標】 - 救助活動による救済者数 - 補修技術が適用された建物の数 - 耐震基準に合致する建物数</p>	<p>【上位目標】 (変更なし)</p> <p>【上位目標達成の指標】 (変更なし)</p>	<p>【上位目標達成状況】 大規模プロジェクトに本プロジェクトの成果が適用されつつあるが、プロジェクト開始前と大きな変化はないように見受けられる。</p>	
	<p>【上位目標達成への外部条件】 ・観測網システムが拡張・改善される。 ・適用可能な補修技術が開発される。 ・救援体制が劣化しない。 ・耐震基準が研究成果に基づき改訂される。 ・適切な行政指導が行われる。</p>	<p>【上位目標達成への外部条件】 (変更なし)</p>	<p>【外部条件の変化の有無】 (特になし)</p>	
3. 成果の達成状況と目標達成状況の関連性	<p>・本プロジェクトにおいては成果が達成された際にプロジェクト目標が達成されるための重要な外部条件は特に見あたらない。すなわち、成果が達成されればほぼ自動的にプロジェクト目標は達成されることとなる。 「プロジェクトの実績、成果」の項で述べられているように成果の一部が達成されておらず、その範囲でプロジェクト目標は達成されていない。</p>			<p>【成果が目標達成に結びつかなかった理由】 ・成果が達成された範囲内で目標は達成されている。</p>

VI. 波及効果

(本案件は地震防災のための基礎的なデータ・知見の蓄積を目的とする研究プロジェクトであり、社会、経済、自然環境に直接大きなインパクトを与えるような性質でないため、インパクトの分析は技術的側面と法制・行政面に限って調査した。)

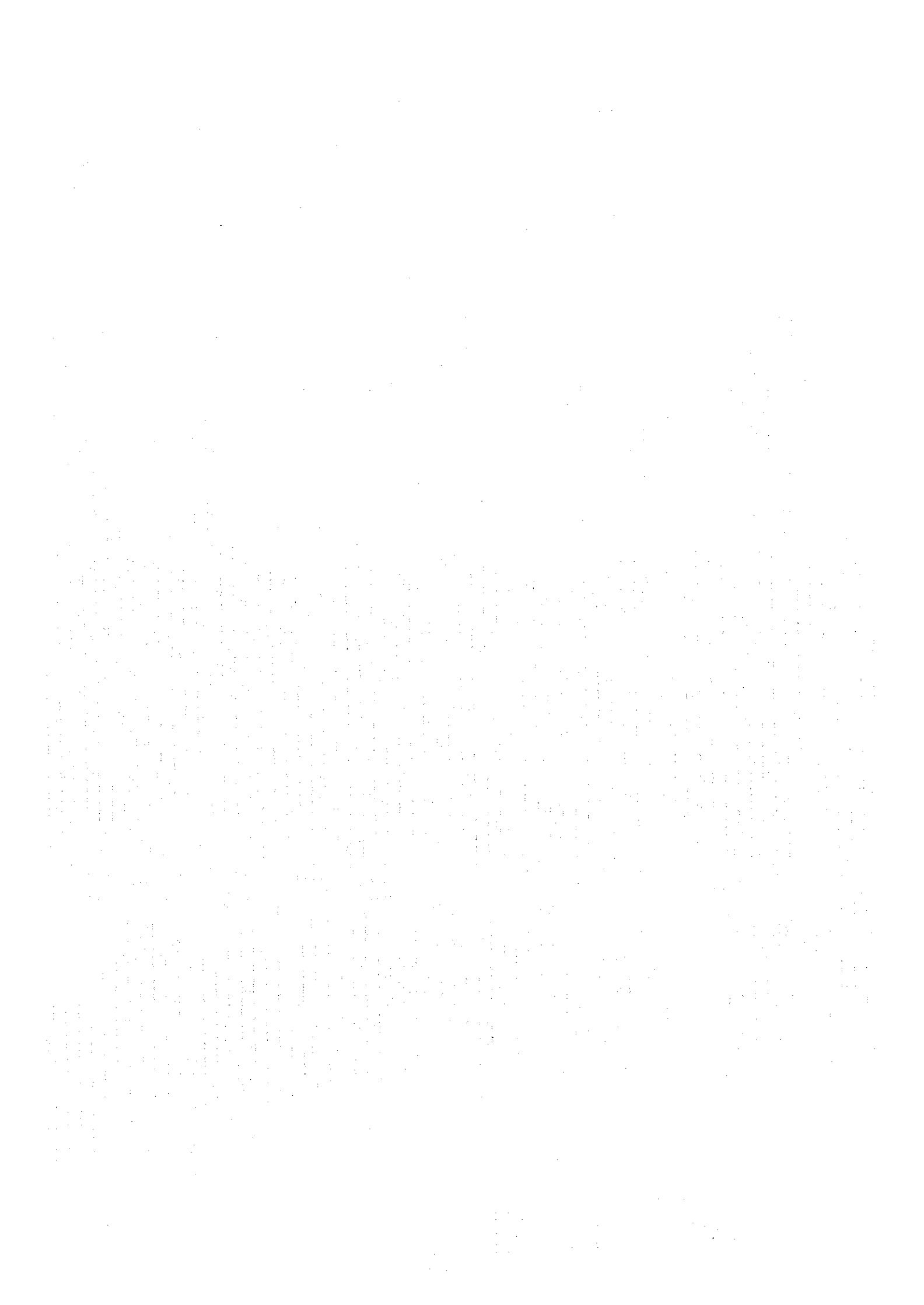
効果の広がり と受益者	技術的 インパクト	法制・行政に対する インパクト
プロジェクト・レベル のインパクト	プロジェクトに参画した者、特に若手の参加者は、派遣専門家による指導およびカウンターパート研修を通じて、高度な専門技術を有する日本の専門家の指導を受ける機会を得て、その技術レベルを大きく向上させた。これらの人材は今後の地震防災に係る研究の中心的役割を担うに十分なまでに育成されつつある。	<ul style="list-style-type: none"> ・本プロジェクトにおいて研究された補修技術・地盤特性の解明技術は大規模プロジェクトに適用されつつある。地震に対して脆弱な数多くの建物（農村部の組積造住宅、市街地のRC建築）については未だ適用されていないものの、地震工学サブセンターは今回のプロジェクトの成果を以て、近々正式に設立される教育サブセンターを通じ、設計技術者および学生を教育訓練するための技術を備えつつあり、今後補修技術の適用・耐震基準の遵守に大きく寄与することは十分に期待される。 ・強震観測網の中央センター・地域センターであるアンカラ・サムスンにおいて開催されたセミナー等数多くの機会に今回設置される観測網システムの内容が紹介され、数多くの自治体職員等実際の救援活動に従事している者がこのシステムの機能・重要性を認識し、本システムに注目している。
セクターレベルのイン パクト	本プロジェクトにおいて数々のセミナー・ワークショップが開催され、その成果はトルコ・周辺国の多くの研究者に紹介された。さらにトルコ内外多くの大学からの研究者が本プロジェクトに参画し、その成果を享受・共有しつつある。	<ul style="list-style-type: none"> ・強震観測網システムの内容紹介は新聞にも報道され、地域住民の本システムに対する理解も高まっている。
効果発生及びその広がり の要因（予期した効果 が発生しない場合の 理由を含む）	<ul style="list-style-type: none"> ・本プロジェクトの実施スタッフは若手を中心に選抜されたこと、もしくは若手の人材に研究参加機会が広く与えられたことによる。 ・本プロジェクトにおいてはセミナー・ワークショップに力点が置かれ、頻繁に開催されたことによる。 	

VI I. 自立発展性の見通し

<p>1. 制度・組織的側面 政策的支援、スタッフの配置・定着状況、関連組織との連携、運営管理能力の観点から記述</p>	<ul style="list-style-type: none"> ・公共事業省防災総局は局長自らがプロジェクト・リーダーとなり、プロジェクト実施に絶大な支援を続けており、今後もその支援を続ける意向である。 ・実施機関の組織的改廃は特になく、期間中の組織に関する変更点は公共事業省防災総局地震防災部の部長交代のみであり、部長交代も本プロジェクト実施のさしたる支障とはならなかった。 ・協力が開始されて以来実施機関を去ったカウンターパートはおらず、今後もそれぞれの組織に留まる見込みである。 ・プロジェクトの実施を通じて確立された日常管理システムは今後も機能し続け得ると考えられる。ただし、運営（委）合同（委）の設業についてはトルコ側の努力が必要である。
<p>2. 財務的側面 必要経費の資金源、公的補助の有無、財務状況の観点から記述</p>	<ul style="list-style-type: none"> ・プロジェクト期間を通じてトルコ側は通常予算による割り当ての他、防災特別基金等各種の財源から必要経費を確保してきた。今後も引き続き確保可能であると考えられる。さらに、プロジェクトの実績が上位機関等に報告されることにより、さらにそれらの機関からの支援を受けやすくなり、より多くの資金確保が可能となることが期待される。
<p>3. 技術的側面 移転された技術のレベル、施設器材の管理状況、現地の技術的ニーズとの合致度等の観点から記述</p>	<p>かなりの量の技術移転がなされてはいるものの、各サブセンターは技術的な自立発展性の獲得について以下の課題を抱えている。</p> <ul style="list-style-type: none"> ・強震観測実験サブセンターについては観測網システムの設置を終えつつあるところで、同システムの運営については未だ技術的な自立発展性を得ていない。 ・地震工学実験サブセンターについては概ね技術的な自立発展性も得ているとはいえ、アクチュエータ装置の2度に亘る故障により、操作に対する自信を十分に得ていない。また、今後防災のための事前対策を確立していく上で課題を抱えており、十分な技術的自立発展性を得ているとはいえない。

VIII. フォローアップの必要性

<p>1. 協力期間延長の 要否</p>	<p>要/不要：要 (理由) プロジェクト目標達成のための重要な活動である強震観測網システムによる観測・記録分析、地震被害・被災危険性評価のための実験が行えるようになるためには何らかの協力継続が必要である。地震工学実験サブセンターについても、今後自力で実験・研究を継続し、プロジェクト目標を完全に達成し、さらに地震災害防止事前対策確立・実施に寄与していくための技術的自立発展性を獲得するために何らかのフォローが必要である。</p>
<p>2. フォローアップの 内容と方法</p> <p>(1) フォローアップの 必要な分野</p> <p>(2) フォローアップの 内容</p> <p>(3) フォローアップの 所要期間</p> <p>(4) 期待される成果</p>	<p>地震観測網実験サブセンター、地震工学実験サブセンターともに必要である。強震観測網実験サブセンターについては観測網システムによる観測、記録分析、地震被害・被災危険性評価のための技術指導が必要であり、地震工学実験サブセンターについては実験を継続・発展解析させていくための技術指導が好ましい。</p> <p>主な機材は供与されており、スペアパーツなどの追加機材は必要であろうが、主体は専門家派遣・カウンターパート研修による技術指導である。</p> <p>強震観測網実験サブセンターについては、当初観測網システム設置以降の活動が約2年間を予定していたため、2年間は継続する必要が認められる。地震工学実験サブセンターについては統一の期日が必要と見出される。</p> <p>プロジェクト目標の達成、および今後トルコ側が自力で実験・研究を継続・発展させていくための技術的自立発展性を得ることが期待される。</p>



JICA