TABLE 6-IV Number Of Leaks/Breaks Per 'Delegacion' In The Secondary Distribution System In The Federal District

	Diameter Of Pipeline, (In)												
Delegacion	2	2 1/2	3	4	6	8	10	12	14	16	18	Other	Total
Azcapolzalco	8	0	0	53	15	1	0	11	0	0	1	236	325
Cuajimalpa	0	0	0	1	0	0	0	0	0	0	0	2	3
Tlalpan	0	0	0	56	6	1	0	4	0	0	0	6	73
Tlahuac	14	0	0	587	79	3	0	15	0	0	0	75	773
Coyoacan	0	0	1	27	11	0	0	8	0	0	0	34	81
Miguel Hidalgo	3	0	0	44	8	0	0	5	0	0	0	103	163
Magdalena Contreras	5	0	0	28	7	0	1	1	0	0	0	227	269
Alvaro Obregon	0	0	0	65	9	0	0	4	0	0	0	26	104
Benito Juarez	5	0	2	110	31	2	0	13	0	0	0	95	258
Xochimilco	1	0	0	414	16	0	0	3	0	0	0	29	463
Cuauhtemoc	24	0	0	74	117	1	1	26	0	0	0	119	362
Iztacalco	6	0	1	136	95	0	1	34	0	1	0	103	377
Venustiano Carranza	8	2	1	177	84	2	0	18	0	2	0	23	317
Iztapalapa	5	0	7	241	94	1	0	40	0	1	0	374	763
Gustavo A. Madero	16	0	1	341	64	3	5	51	0	0	0	303	784
Totals	95	2	13	2354	636	14	8	233	0	4	1	1755	5115

fixed points such as crossings, bends, 'T's', valve boxes etc., as shown in figure 6-18. Failures in the body of the pipes were less frequent and from discussion with engineers in charge of the repairs, these occurred along pipes already weakened by relative settlements which is common in all the urbanized areas of the Lake Zone. As may have occurred in the D.F, some of the failures may have occurred at the joints weakened by differential settlements. The failure rate for Ciudad Nezahualcoyotl was .831 breaks per km.

Damage to the water distribution system of the 'Municipio de Ecatepec' located in the State of Mexico, consisted of about 760 leaks. Unfortunately only 334 of these leaks are well documented. Table 6-V shows the number of documented failures for each diameter. Failures typically occurred at joints with characteristics similar to those in other damaged areas. For the documented leaks, the corresponding failure rate was 1.11 breaks per km.

Of interest is the damage to the well shaft supplying water to the 'Caldera' tank, as shown in figure 6-19. In addition the shafts of six wells located on the lake 'Nabor Carrillo' where damaged. The machinery of these wells was located 7m above the water surface. Hence the well shaft damage at Nabor Carrillo could have been due to inertia forces.

6.3 Service Connection

Street mains in Mexico City are generally buried at a depth of approximately 60 cm below the street surface. The small pipes which provide water to individual users from the street mains are called service connections. The service connections are attached perpendicular to the street main.

Damage statistics available to the authors indicate that most of the damage to the service connection occurred at its attachment point to the main. Seismic damage to service connections in the Federal District was fairly heavy while no service connection damage was reported in the State of Mexico.

An investigation of the different types of service connections used in the metropolitan area showed that in the affected area controlled by the Federal District, service connections were made of galvanized iron. These galvanized iron service connections shows some signs of deterioration due to corrosion

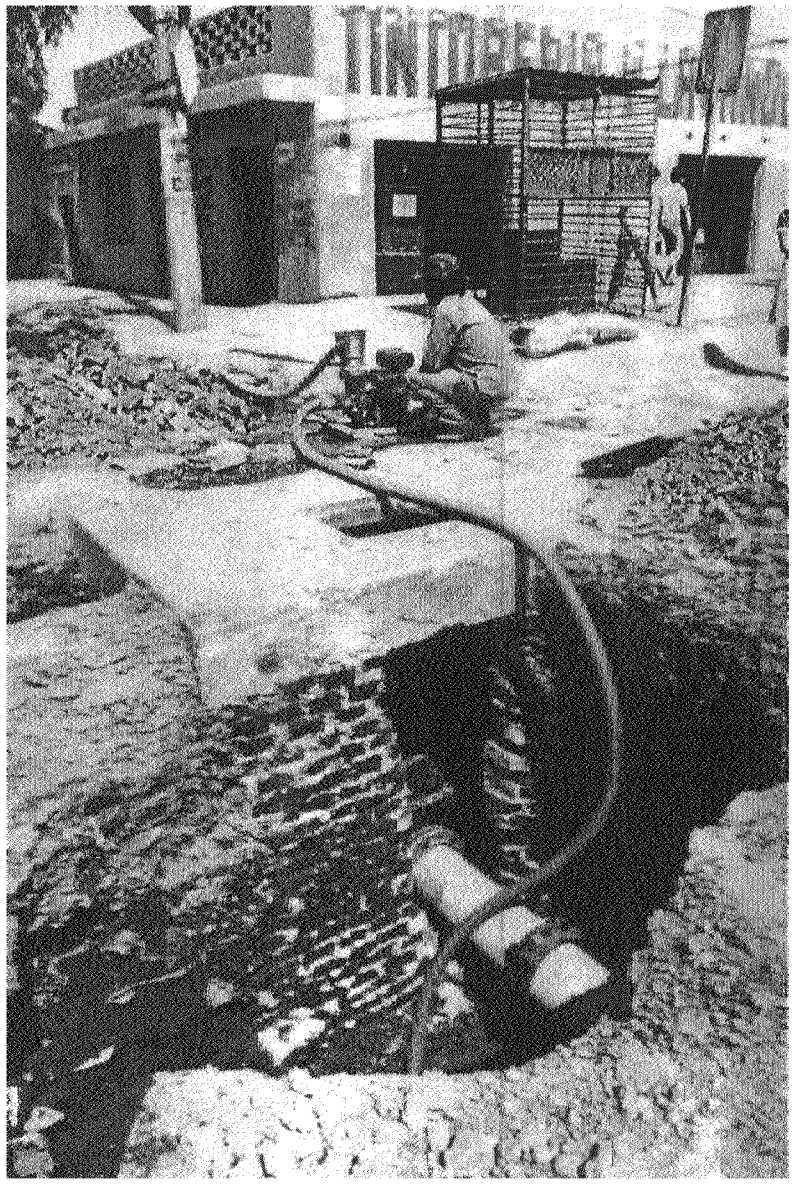

FIGURE 6-18 Repaired Leak At A Valve Box