3,965

4,035

		I duit		as a											
Cement Lot No.	Used in Series No.	Fineness Test Residue on 200.	Normal Consistency Per Cent.	٦ Ir h	icat itial. m.	Nee Fi h.	Time edle nal. m.	e of	Settin Gilli Ini h.	g more tial. m.	Ne Fir h.	eedle nal. m.	Soundness Test (over boiling water).		
3,768 3,965	81 89, 93	18.0 18.8	24.5 23.0	53	40 40	8 7 0	40 36		6 5 6	20 15 00	8 8 0	50 32 30	OK. "		
4,000	90, 97	Ta	ble 3—Strength	Tes	ts of	i Ci	emen	ıt							
Cement Lot No. 3,768	Wate Usec Per Ce 10.5	er d ent. 7 d	Tensile Strength (Briquets) days. 28 days. 3 months. 292 368 419					7	Compressive Strength (2 by 4-in. Cylinders) 7 days. 28 days. 3 months. 2,120 3,580 4,320						

462

402

378

386

Table 2-Miscellaneous Tests of Cement

1-3 Standard Sand Mortar.

Values for strength tests are expressed in pounds per square inch. Each value is the average of 5 tests made on different days.

242

246

each condition on different days. Compression tests were made at ages of 7 and 28 days and 3 months.

10.3

10.3

Materials

The cement used consisted of a mixture of equal parts of four brands purchased in the Chicago market. The brands were thoroughly mixed by placing one sack of each in the mixer and running for about 1 minute. Complete tests of the different lots of mixed cements are given in Tables 2 and 3.

The aggregates consisted of sand and pebbles from the Chicago Gravel Company's plant near Elgin, Ill. This material was received in carload lots in the form of coarse 'orpedo sand, graded up to $\frac{3}{4}$ in. in diameter, and pebbles graded from $\frac{1}{4}$ to $1\frac{1}{4}$ ins. Before using, the sand was screened through a No. 4 sieve. All material retained on this sieve was added to the pebbles. The pebbles were all from the same shipment. The material was shovelled over several times and stored for use in a shallow bin. In most of the tests the aggregate was graded up to $1\frac{1}{4}$ ins. by mixing a certain percentage of sand with the pebbles. In Series 93 the aggregates of the smaller sizes were prepared by using the sand which was finer than No. 14, No. 8 and No. 4 sieves respectively.

The sieves used in all of these tests were what are known as the Tyler standard sieves, manufactured by the W. S. Tyler Company, Cleveland, Ohio. The dimensions of the sieves used are given in Table 4. Table 5 gives the grading and other properties of the aggregates. The sieve analyses are the average from samples taken at intervals throughout the period covered by the tests.

1,770

1,700

3,360

2,640

4,380

3,750

Table 4—Sizes of Sieves Used in Sieve Analysis of Aggregates

			Diameter of
Sieve No.	Size of	f Clear Opening	of Wire
or Size.	-i	in. mm.	in.
100		058 .147	.0042
48		.295	.0092
28	0	23 .59	.0125
14		46 1.18	.025
8		93 2.36	.032
4	I	85 4.70	.065
3/8 in		7 9.40	.092
3/1 in	7	4 18.8	.135
1 1/2 in	I.5	38.0	
	and the second	· · · · · · · · · · · · · · · · · · ·	and the second se

Brass wire cloth sieves with square openings.

The weight per cubic foot of the aggregate was determined by means of machined cast-iron measures, having capacities of 1/5 and $\frac{1}{2}$ cu. ft. The $\frac{1}{2}$ cu. ft. measure was used for the larger sizes; the 1/5 for the smaller sizes. The inside diameter of each measure is equal to the depth. The test was made by filling the measure about $\frac{1}{3}$ full and puddling with a small steel bar pointed at the lower end. Filling and puddling was continued in like manner till the measure was full. After striking off with a straight-edge, the weight was determined.

		Tab	le 5-N	otes on .	Aggreg	gates					
Ref.	Range in Size	A	mount F	iner that	n Each Weight	Sieve			Weight lb. per	Density.	Voids.
Series.	100	48	28 14	8	4 3/8	3⁄4	I 1/4	2	cu. ft.		
			S	ERIES 8							
All	0-1¼ in. 0	2	11 18	28 4	0 50	80	100		130	.781	.219
			9	ERIES 8	9						
A11	0-1¼ in. 0	3	11 16	21 4	4 50	82	100		130	.781	.219 .
				ERIES O	3						
10			-8 100		5				104	.626	.376
49-54, 249	0-14 2	11	12 72	100					110	.660	.340
55-00, 255	0-8 1	6	42 /2	72 10					115	.601	.309
01-00, 201	0-4 I	0	30 54	56 7	7 100				124	.746	.254
07-72, 207	0- 98 111. 1	5	23 40	25 1	60	100			126	.756	.244
73-78, 273	0- % 1n. 0	4	21 25	21 2	4 51	84	100		130	.781	.219
1-48, 201, 243	0-1 1/4 III. 0	-	6 10	14 2	0 40	60	.80	100	128	.770	.230
79-04, 279	0-2 m. 0	1	0 10		40						
			S	ERIES 9	6						
A11	0-1¼ in. 0	. 2	10 18	24 3	4 51	84	100		130	.781	.219
	and the state		Stand 1	SERIES O	7			1		a straight	
A11	0-1¼ in. 0	2	10 18	24 3	4 51	84	100		130	.781	.219 .