Table 3 gives the weight per cubic foot and voids of various artificial mixtures (specific gravity of gravel and sand taken as 2.65).

Table 4 gives the weight per cubic foot of a number of miscellaneous materials tested in the laboratory.

Table 4.—Weights Per Cubic Foot of Miscellaneous Materials.

Material From District Pit No. 1	Weight Per Cu. Foot Loose and Dry	Weight Per Cu. Foot Shaken and Dry
Passing 1¼ in. screen and held on 1 in. screen		102
" 1 in. " " ¾ in. "		106
" ¾ in. " " ½ in. "	95.8	105
" ½ ln. " " ¼ in. "	96.6	106.7
" ¼ in. " " ⅛ in. "	96.6	108.5
" ⅛ in. " " No. 10 "	92.6	106.0
" No. 10 " " No. 20 "	92.6	104.5
" No. 20 " " No. 40 "	89.2	102.5
" No. 40 " " No. 75 "	91.3	102.0
" No. 1 " " ¼ in. (St. Line Grading)	103.0	

The effect of moisture on weight per cubic foot of a typical sand may be seen from Table 5.

Table 5.—Mechanical Analysis of Sand.

Sieve No.	Percentage passing, dry weight.
⅛"	100
No. 10	91
No. 20	66
No. 40	43
No. 75	15
No. 100	12

Weight per cubic foot, loose and moist.	Percentage of water by weight of dry sand.
100	0.
79	3.6
83	6.0
85.5	8.4
106.5	13.
118	16.

Miscellaneous Tests.—To check the value for specific gravity of 2.65 used in determination of voids in aggregate, Table 6 shows the value obtained from various materials taken from District Pit No. 1:—

Table 6.—Specific Gravity of Various Materials.

Material	Size	Specific Gravity	Average Specific Gravity (For Group)
Limestone (Gravel)	1 in.	2.60	
"	1 in.	2.63	
"	1 in.	2.68	2.64
Granite (Gravel)	1 in.	2.67	
"	1 in.	2.67	
"	1 in.	2.64	2.66
Gravel from Bins	¾ to ½ in.	2.64	
"	½ to ¼ in.	2.69	
"	¼ to ⅛ in.	2.65	
Sand from Bins	⅛ to No. 10	2.65	
"	No. 10 to No. 20	2.67	
"	No. 20 to No. 40	2.64	
"	No. 40 to No. 70	2.64	2.65

The amount of silt in the sand from McCorkell pit averaged by decanting test 1.1% of dry weight of sand sample.

Comparisons with the strength of Ottawa sand 1:3 mortar were made using various sands. The analysis shows the grading of an artificially graded sand representing the average of eight test pits from District Pit No. 1.

Mechanical Analysis.

Sieve No.	Percentage by Weight passing.
⅛"	100
No. 10	71
No. 20	41
No. 40	19
No. 75	4
No. 100	3

When made up in 1:3 mortars of the following percentages of strength to compare with standard Ottawa sand, it gave a strength of Ottawa sand—each average of four briquettes:—

7 Days.	28 Days.	90 Days.
126%	117%	134%

The effect of adding fine sand is shown in Table 7, which gives the mechanical analysis of the sands used for the 1:3 mortars. Table 8 gives the tensile strengths (results are average of four briquettes) at various ages.

Table 7.—Mechanical Analysis of Sand.

Sand No.	Percentage by Weight passing Sieve						Weights per cubic foot dry	
	⅛ in.	No. 10	No. 20	No. 30	No. 40	No. 75	No. 100	Loose	Rammed
1			100		0				
2	100	71	41		19	4	3	106	116
3	100	71	42		21	6	5	107	119
4	100	72	43		23	9	8	108	119
5	100	74	47		27	13	12	110	119
6	100	75	50		32	19	18	110	121

Table 8.—Tensile Strength of 1:3 (by weight) Mortars.

Sand.	Tensile strength in lbs. per square inch. 7 Days.	28 Days.	90 Days.
(1) Standard Ottawa sand	196	305	338
(2) Average of 8 test pits	248	356	455
(3) Average of 8 test pits with fine to give 5% fine in total..	275	334	448
(4) Average of 8 test pits with fine to give 8% fine in total..	303	364	503
(5) Average of 8 test pits with fine to give 12% fine in total..	246	300	432
(6) Average of 8 test pits with fine to give 18% fine in total..	237	285	352

Proportioning and Mixing Materials.—All proportioning was carefully done by weight measurement. The aggregate for each specimen was made up by weighing out definite amounts of the various sizes required by the mechanical analysis for that particular mixture. The cement and water were also measured by weight. For the tensile strength briquettes a consistency similar to that used for the Ottawa sand was used. A medium wet or mushy consistency which allowed for the mixture to flow well into the forms was used for the permeability and compression test mixtures; 50 revolutions of a cube mixer gave thorough mixing to the different specimen batches.

Compressive Strength.—Standard 8-in. diameter by 16-in. long cylinders were used for the compression test specimens. All mixtures with the medium wet consistency used worked well in the forms except three mixtures which were deficient in mortar and so required considerable