At each instrument-station enter in the notes the nature of the shore, the rise of the ground from the water's edge, the depth of the water as determined from soundings in the boat by one of the rodmen, the estimated distance to the foot or top of the slope when the lake lies in a valley, and such other data as may be considered useful.

SAND SPECIFICATIONS.

IN connection with the conclusions arrived at by the Engineering Experiment Station of the University of Illinois, following the extensive tests to ascertain the mortar-making qualities of various sands, the specifications, given below, are proposed:—

It is generally acknowledged that the specifications most frequently used for sand are inadequate in that they are too brief or two indefinite to secure the desired results. Recent specifications have overcome these defects in some respects, but most of them are objectionable in that they are too inflexible, i.e., fail to allow variations in the quality of the sand to meet varying conditions or different requirements, or else by placing undue stress on some particular requirement bar from use sands which would prove entirely satisfactory. The following specifications have been prepared with the idea of giving this necessary flexibility and at the same time making them sufficiently rigid. It is not intended, however, that these specifications should be used indiscriminately for all purposes, but rather that they should serve simply as a guide in preparing the specifications for any particular piece of work. In preparing these specifications both the specifications proposed by the national engineering societies and the results of the test described in the bulletin have been taken as guides.

Definition of Sand and Screenings. — The term "sand" shall be understood to mean natural sand which will pass, when dry, a screen having ¼-in. clear openings. Similar material which is the product of artificial crushing shall be known as "screenings," and shall conform to the specifications for sand.

Suggested Classification of Sands.—Sands shall be classified as No. 1, No. 2, No. 3, plastering sand, and grout sand, the several grades being suitable for the following classes of work:—

No. 1 sand is that required in reinforced concrete and in other work requiring a mortar of maximum strength and density.

No. 2 sand is that required in work not demanding maximum strength or density, but still requiring a mortar of high quality.

No. 3 sand is that required where high strength or density is not a controlling factor.

Plastering sand is that for use in ordinary plastering over masonry, concrete, and wood or metal lath. Either No. 3 sand or plastering sand is of high enough quality for use in lime mortars. The latter sand should be used where the thickness of the mortar joint is such as to require grains of small size.

Grout sand is that for use in pavement fillers and other work requiring a thin, smooth, free-running grout.

Specifications for No. 1 Sand.

Composition.—No. 1 sand shall consist of grains from hard, tough, durable rocks, and be free from soft, decayed, or friable material.

Cleanness.—The sand must be free from lumps of clay, loam, or other foreign material. It shall not contain more than 2 per cent. by weight of finely divided clay, loam, or other suspended matter when tested by washing in such a manner as to remove all such material without removing any of the finest sand; provided, that if the strength of the mortar made from the sand is greater than 110 per cent. of the strength of a similar mortar made with standard Ottawa sand, the amount of suspended matter may reach 3 per cent. This suspended matter must not form a coating around the grains to such an extent that such coating is not entirely broken up and removed from the grains by sprinkling with water or in the mixing of the mortar or concrete. The sand shall be free from oily or greasy matter in any form and must contain no organic silt.

Roughness.—The grains shall have rough, unpolished surfaces to which the cement paste will readily adhere.

Size of Grains.—The grains shall be well graded in size from the finest to the coarsest. For the greatest density not more than 8 per cent. by weight, including the suspended matter, shall pass the No. 100 sieve, and not more than 60 per cent. the No. 16 sieve. If maximum density is not essential and the mortar yields the required strength, these quantities may be increased to 12 per cent. and 75 per cent., respectively.

Voids. — The voids in the dry sand, when well shaken, shall not exceed 33 per cent. of the total volume of the sand.

Tensile Strength.—Mortar, in the proportions of 1:3 by weight, when tested at an age of 28 days, shall develop a tensile strength at least equal to the strength of a similar mortar made of the same cement and standard Ottawa sand tested at the same age.

Specifications for No. 2 Sand.

General Requirements.—No. 2 sand shall meet the requirements for No. 1 sand in all respects except as follows:—

Cleanness.—The suspended matter shall not exceed 6 per cent. by weight when tested in the same manner as described for No. 1 sand.

Size of Grains.—Not more than 15 per cent. by weight, including the suspended matter, shall pass the No. 100 sieve, and not more than 80 per cent. the No. 16 sieve.

Voids.—The voids shall not exceed 35 per cent. of the total volume.

Tensile Strength.—The tensile strength shall equal at least 80 per cent. of that of the standard Ottawa sand mortar when tested as described for No. 1 sand.

Specifications for No. 3 Sand.

No. 3 sand shall meet the requirements of No. 2 sand, except that the suspended matter may reach 8 per cent. and the tensile strength be as low as 65 per cent. of that of the standard Ottawa sand mortar.

Plastering sand shall meet the requirements for No. 3 sand in all respects, except that for the finishing coat it shall be of the requisite fineness to give the desired finish.

Grout sand shall meet the requirements for No. 3 sand except as follows:—

It shall all pass a No. 16 sieve. The voids shall not exceed 38 per cent. of the total volume. The tensile strength shall be at least 40 per cent. of that of the standard Ottawa sand mortar.

The firm previously known as the Canadian Contractors, Limited, of Winnipeg, has recently changed its name to "Joseph Macdonald and Company, Limited."