

inserted in newly laid concrete, but these must not be closer together than 2 in., otherwise the strength of the material may be impaired.

Fine aggregate consists of fine, clean sand, and this is required to fill up the spaces between the stones of the coarse aggregate.

Water.—Water used in mixing concrete should be of a standard such as that required for livestock. Where fresh water is unavailable, sea water may be used, but the resulting concrete often shows an efflorescence, and has a "mouldy" appearance.

Amount of Water

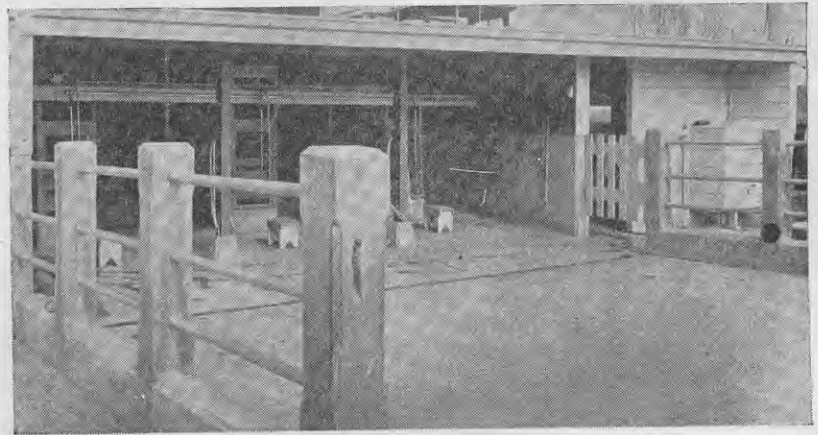
Proportions.—It has been shown that the amount of water used to a given quantity of cement has a direct bearing on the strength of the resulting material, provided, of course, that the consistency of the mix is the same in both cases, that is to say, 1 bag of cement mixed with 6 gallons of water would produce a mix which would be twice as strong as one prepared from 1 bag of cement to 10 gallons of water. It will be understood, of course, that the 6 gallon mixture will not produce as much concrete as the 10 gallon mixture.

For ordinary good concrete such as that required in the construction of paths, cow-yards, floors, and walls, satisfactory results may be obtained by using about 8 gallons of mixing water to each bag of portland cement (124½ lb. net) and then mixing in as much of the aggregate as is required for good consistency. With average ¾ in. aggregate, the above will generally yield about 7 cubic feet of set concrete for each bag of cement used.

Extra Strong Concrete

For extra strong concrete, such as that required for hard-wearing floors, tanks, troughs, etc., or resistance to milk acid attack, a mix of not more than 6 gallons of water to each bag of cement should be used. In this case only about 5 cubic feet of set concrete will be obtained by using ¾ inch aggregate.

These proportions are the limits to which it will be found necessary to go in constructing any type of article such as is likely to be used in farming practices. Fence posts are satisfactorily made from a mix containing 7 gallons of water to each bag of cement.



Properly laid concrete makes an excellent floor for the milking shed.

The following tables give the average quantities of sand and gravel to mix with one bag (124½ lb.) of cement for extra strong and ordinary concrete:—

EXTRA STRONG AND WATERTIGHT CONCRETE.

If material used is graded in size up to:	Quantities to mix with one bag cement and 8 gallons water.		OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately)
	Sand, moist, loose measurement.	Gravel (or metal), loose measurement.		
Sand only	4 cubic feet	—	—	3½ cubic feet
¾ in.	2½ cubic feet	4 cubic feet	4½ cubic feet	4½ cubic feet
¾ in.	2½ cubic feet	4½ cubic feet	4½ cubic feet	4½ cubic feet
¾ in.	2½ cubic feet	4½ cubic feet	5 cubic feet	5 cubic feet
1 in.	2½ cubic feet	5½ cubic feet	5½ cubic feet	5½ cubic feet
1½ in.	2½ cubic feet	5½ cubic feet	5½ cubic feet	5½ cubic feet
2 in.	2½ cubic feet	5½ cubic feet	5½ cubic feet	5½ cubic feet
3 in.	2½ cubic feet	5½ cubic feet	6 cubic feet	6 cubic feet

ORDINARY GOOD CONCRETE.

If material used is graded in size up to:	Quantities to mix with one bag cement and 6 gallons water.		OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately)
	Sand, moist, loose measurement.	Gravel (or metal), loose measurement.		
Sand only	6½ cubic feet	—	—	4½ cubic feet
¾ in.	4 cubic feet	6 cubic feet	7½ cubic feet	6½ cubic feet
¾ in.	4 cubic feet	6½ cubic feet	7½ cubic feet	6½ cubic feet
¾ in.	4 cubic feet	7½ cubic feet	8 cubic feet	7 cubic feet
1 in.	4 cubic feet	7½ cubic feet	8½ cubic feet	7½ cubic feet
1½ in.	4 cubic feet	8½ cubic feet	8½ cubic feet	7½ cubic feet
2 in.	4 cubic feet	8½ cubic feet	8½ cubic feet	8 cubic feet
3 in.	4 cubic feet	8½ cubic feet	9 cubic feet	8½ cubic feet

The size of the aggregate used will depend on the concrete work on hand, or on the size available.

This table holds good only in cases where "pure" materials are used. The gravel, for instance, is considered to be free from sand. However, in most cases the gravel will be found to contain a certain amount of sand, and the table will have to be adjusted accordingly. This is done by trying out a sample of the proposed mix.

Suppose we have an aggregate of ¾ in. average size which we require to make into ordinary good concrete, a glance at the table shows that we require 7½ cubic feet of gravel and 4 cubic feet of sand to each bag of cement. On mixing together (without the cement) they should give a total volume of 8 cubic feet. If the result gives a return of more or less than 8 cubic feet, the amount of sand must be adjusted accordingly.