Class C concrete shall be used for all footings and cut-off walls, unless otherwise specified on the plans or directed in writing by the engineer.

Unless otherwise specified on the drawings, all reinforcing steel shall consist of bars which have been deformed in some approved manner. No plain bars will be permitted except as shown on the drawings or directed in writing by the engineer.

The steel bars shall have the net sectional area and shall be placed in the exact positions indicated on the drawings.

Unless otherwise specified on the drawings or in writing by the engineer, all reinforcing bars shall be of medium steel having an elastic limit of not less than 35,000 pounds per square inch, and shall be sufficiently malleable to withstand bending cold with a radius equal to twice the diameter or thickness of the bar through 180° without fracture.

When placed in the concrete, the reinforcing steel shall be free from grease, dirt, and rust, and it shall be the duty of the contractor to provide means for properly cleaning the steel.

Thorough contact of the concrete with every portion of the surface of the steel shall be obtained.

Unless otherwise specified on the drawings or in writing by the engineer, necessary splices in reinforcing bars shall be effected by overlapping the ends of the bars a distance equal to 40 times their thickness or diameter.

Inspection and Testing .- All materials used in connection with the work being done under these specifications shall be purchased especially for that work. The contractor shall furnish the engineer with complete copies of all orders for materials, and shall make all orders subject to the engineer's approval of the materials.

The engineer or his representative shall stamp each accepted piece or parcel with a private mark, and any material not so stamped may be rejected at any stage of the work. The engineer's acceptance, however, does not relieve the manual of the the manual second teller. relieve the contractor from responsibility for faulty material or workmanship and wherever such faulty material or workmanship and wherever such that or removed and replaced, as the engineer may direct, by the contractor at his own expense.

The contractor shall furnish the engineer or his representative all facilities for testing materials and workmanship at the shop where material is fabricated, and shall shall notify the engineer well in advance of beginning the shop work.

The contractor shall furnish all facilities for testing the weight and quality of all material at the mill where it is many from the second se is manufactured. He shall provide, free of cost, a suitable testing machine for making the tests and such test specimens as the engineer or his representative may require.

Erection.-Unless otherwise specified in writing by the contracting parties, the contractor shall furnish all labor labor, tools, machinery, and materials for erecting the bridge bridge complete in place and ready for traffic, in accordance with these specifications and the plans furnished or approved by the engineer.

The contractor shall do all necessary hauling, set all stone or anchor bolts, remove existing structures when necessary anchor bolts, remove existing structures when necessary, and perform all other incidental work for which express provision has not been made.

The contractor shall so conduct all his operations as not to interfere with the work of other contractors or close any thoroughfare by land or water except by written consent of the engineer.

The contractor shall assume all risks of damage or accident to persons or property prior to the final acceptance of the finished structure.

The contractor shall remove all false work, piling, and other obstructions produced by his operations, and shall perform any additional work necessary to produce a sightly appearance in the immediate vicinity of the structure.

ANALYSIS OF COALS.

An increasing proportion of the coal consumed in the power stations and the larger manufacturing plants is now being purchased under specifications based on chemical analyses and calorimetric determinations of heat units. In the purchase of fuels many matters that have been left to chance are now carefully investigated. It is the aim of mechanical engineers to construct furnaces and to arrange the heat absorbing surface in a furnace with reference to the peculiar character of the fuel which is to be burned. Noting the composition of the fuel and constructing the furnace with reference to it, he can assure efficient and smokeless combustion. Moreover, in any particular market, the choice of coal generally is limited by its quality and by freight rates to one or two fields in which the character of the coal bed is comparatively uniform. Having on hand a representative analysis of the coal from a given bed in any particular district, the engineer can determine whether the coal he receives comes from the bed and the district stated, and whether it is being prepared for market as carefully as it should be. Wide variations in the composition and heating value of the coals from different districts and from different beds make analyses that are comparable, because of the care taken in sampling and analyzing the coal, almost indispensable to engineers having to install boiler or gas-producer plants in different cities, and also to railroads and steamboat companies.

In Bulletin 22, entitled "Analyses of Coals in the United States," the Bureau of Mines has issued information that designing and operating engineers and industrial superintendents will find of great value. Some five thousand samples of coal taken from fifteen hundred coal mines were considered in the report, and much reliable data are presented regarding the chemical composition and heating value of the coals.

The report is in two parts, one giving the methods used in collecting and analyzing the samples, and the results of the analyses, and the other giving the exact location from which each sample of coal was taken, together with a description of the characteristic features of the coal bed at the point of sampling, the nominal capacity of the mine, and such notes on the preparation of the coal as might be useful to consumers. The data contained in these two volumes is not equalled in scope and detail and in value for comparative purposes by the figures that have been published by any other coal-producing country in the world. The Governments of some of these countries have published analyses of coals from different mines and from different districts but, with few exceptions, the samples of coal were not collected and analyzed under a uniform system that would make the results comparable in all respects, and no country has attempted to publish such a large number of analyses that would be comparable, because of the care taken in collecting and analyzing the samples.