CORRESPONDENCE

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Road Paper No. 43

" The Design and Construction of a High-Speed Test Track for Motor Vehicles "†

by

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Correspondence

Mr G. E. Wild observed that, from comments made during the discussion on p. 205, it might have appeared to some that the compaction control exercised during the construction of the earthworks required an excessive number of staff and could, therefore, be criticised as an expensive luxury.

That view was not apparently shared by the Authors, even though the cost of the control work was of the order of 4 to 5 per cent of the value of the earthworks. It should be remembered that, in addition to the direct value of the soil tests in eliminating unsuitable borrow-pit materials and ensuring that the construction operations were completed satisfactorily, there was a less obvious advantage which could be inferred from the conclusion of the Authors " that the embankments can be relied on to support the rigid pavement without significant settlement." In achieving a satisfactory state of compaction, it was reasonable to assume that a high degree of uniformity in the fill had also been obtained. Both those factors would materially assist in minimizing damage to, and distortion of, the concrete paving. A saving in maintenance costs and a reduction in the time the track would be closed to traffic were, therefore, likely to be attained. Without control, the condition of the embankment would have been much more variable and the chances of occurrence of uneven settlement of the paving correspondingly greater. For high speed work the track would obviously have to be kept in first-class order, so that the

† Proc. Instn Civ. Engrs, Part II, vol. 3, p. 189 (June 1954).

expenditure on repairs during the years could amount to an appreciable sum. The interference with the operation of the track would cause further indirect losses of even greater consequence.

The Authors had given an outline of the functions of the control laboratory, which had been organized by Mr Wild's firm, in selecting fill material and checking the finished earthworks. He wished to give a more detailed account of the work that had been undertaken. All soil tests were made in accordance with B.S.1377, 1948.

A total of fifty-two samples was taken from the borrow-pits when they were opened up. For those samples, liquid and plastic limits, and the standard moisture density relations, were determined as well as the natural moisture contents. On the results of those tests a certain amount of borrow-pit material had been rejected as unsuitable and one borrow-pit area was, in consequence, not developed.

Routine checks on the fill material were carried out by taking the material after deposition on the bank, and the samples were subjected to the same treatment as those from the borrow-pits. A total of 143 such samples was taken during the building of the bank.

The compaction achieved in the banks at each stage of construction was checked by measuring the in-situ density after each layer had been compacted. Because the filling consisted primarily of clay, the simple core cutter method was employed and found to be entirely satisfactory. A total of 543 in-situ densities was measured during the initial construction of the banks and a further 209 determinations were carried out on the trimmed subgrade prior to sealing; in addition, about sixty in-situ densities were measured along the north-west straight and about fourteen on the first test section of the bank.

Number of staff employed on the control work varied according to the rate at which construction proceeded. When the laboratory was first opened, one senior assistant was able to deal with the sampling and testing, but during the months of July, August, and September when progress was rapid, two junior assistants were also sent to the site. For one fortnight of that period, a fourth operator was employed. After mid-October, however, only the senior assistant and one junior were retained on site, when they were concerned primarily with subgrade density tests. In addition, two labourers had been attached full-time to the laboratory during the busy period. Light transport was provided since it was impossible otherwise expeditiously to handle the number and weight of samples.

Generally, therefore, the control work was carried out by not more than one senior and two junior technical assistants, supplemented by two unskilled labourers. A typical day's work, once the embankment construction was proceeding normally, consisted of the examination of two or three samples of the borrow material taken either from the borrow-pit or from the embankment and tested for index properties

and moisture-density relationship and the measurement of about fourteen to twenty in-situ densities in the bank as it was compacted.

The Authors, in reply, thanked Mr Wild for his contribution; the figures which he had given were a valuable addition to the Paper.

Mr Wild had put forward the view that the amount of compaction control exercised should not be regarded as excessive, and had emphasized the importance of that aspect of the works. The Authors entirely agreed with that view, and would specify a similar intensity of control in future work of the same kind.

The cost of the tests represented only about 1 per cent of the total cost of the works. It might be argued that, once a proper compaction procedure had been established, more relaxation of the number of tests could have been allowed. At the most, a saving of about £1,000 might thereby have been achieved. Against that argument it should be remembered that the clay soil used for building the banks was not, and could not be expected to be, entirely uniform in character; and relaxation of testing might have resulted in significant changes being overlooked. The Authors were convinced that a saving of the order mentioned was not justified in comparison with the increased risk of heavy maintenance expenditure arising from uneven settlement, which such relaxation of testing would entail.

Railway Paper No. 52

"Railway Civil Engineering in the United States of America" †

by

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and
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Mr C. W. Clarke remarked that the Authors had emphasized that on American railways the permanent way constituted the greatest proportion of the assets, but that applied to any railway, and particularly to overseas railways. For example, the system with which Mr Clarke was connected (Western Australian Government Railways) had, in round numbers, 450 locomotives, 12,000 wagons and 400 coaches, and the total weight of steel involved was approximately 170,000 tons. The system had approximately 4,700 miles of track, which included 580 miles for

† Proc. Instn Civ. Engrs, Part II, vol. 3, p. 273 (June 1954).