VI a 5

SETTLEMENTS OF A VIADUCT, A CULVERT AND THE ROAD-BED IN THE RAILWAY ARNHEM - ZUTPHEN, NEAR VOORSTONDEN

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Before the last war the viaduct across the Voorstonden Brook consisted of 4 spans supported by 2 abutments and 3 piers. It was badly damaged by the war. When being repaired it was replaced by a viaduct and a culvert, both of them built in one of the openings of the former viaduct while the bridges over the two other openings were replaced by sand dams (see fig. 1 and 2). The viaduct and the culvert have a spread foundation.

The sub-soil at that place consists of a layer of clay having a thickness of 2.20 m followed by 0.90 m of sandy clay. This rests upon layers of sand. A boring and a sounding test were made, which are represented in fig.3.

Two undisturbed samples of the layer of clay were tested as to their compressibility in the Laboratory at Delft. The results of this investigation are shown in fig. 4.

By means of these data settlement computations have been made.

The computation of the settlement of the road-bed which replaced the two outermost spans is shown in fig. 5. The ultimate subsidence, which might be expected was calculated at almost 30 cm.

Fig. 6 gives a computation of the subsidence of the culvert, which shows an ultimate subsidence of more than 5.5 cm.

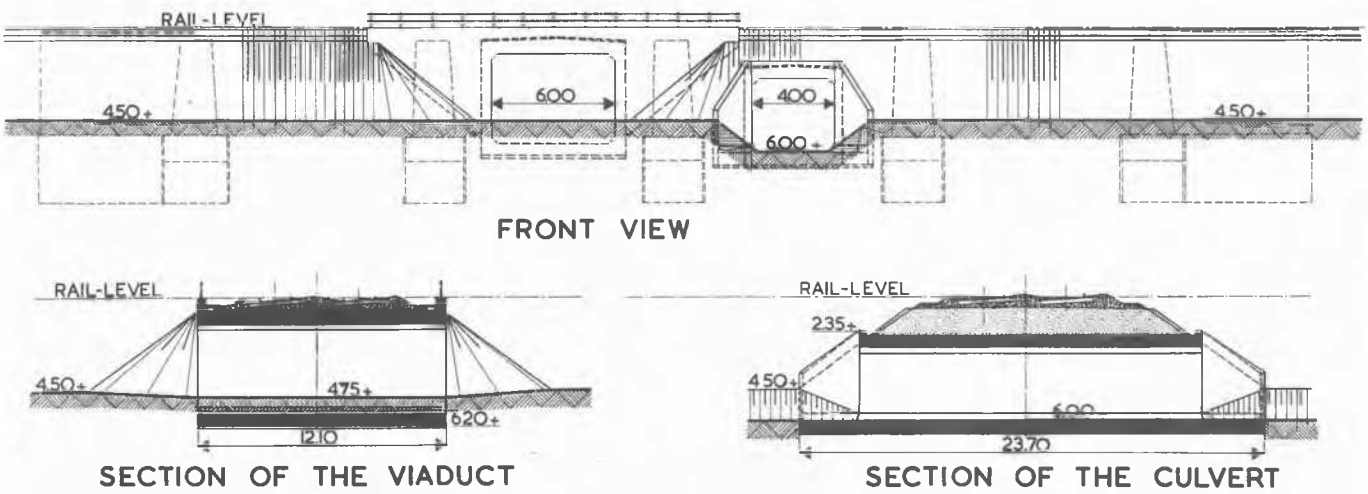
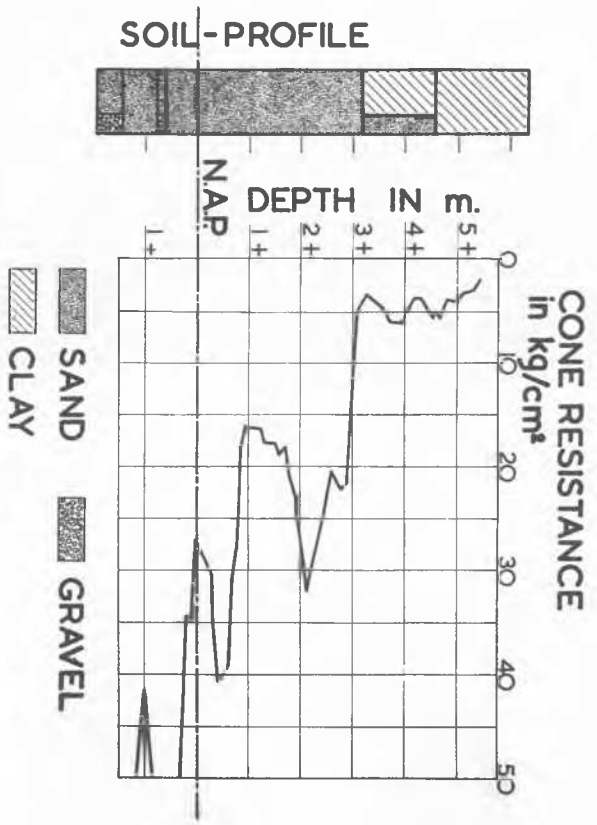


FIG. 1

FIG. 2



Depth sounding test

FIG. 3

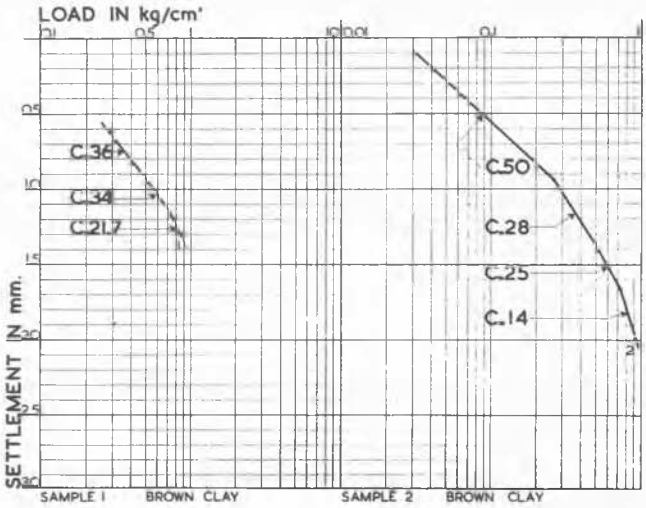


FIG. 4

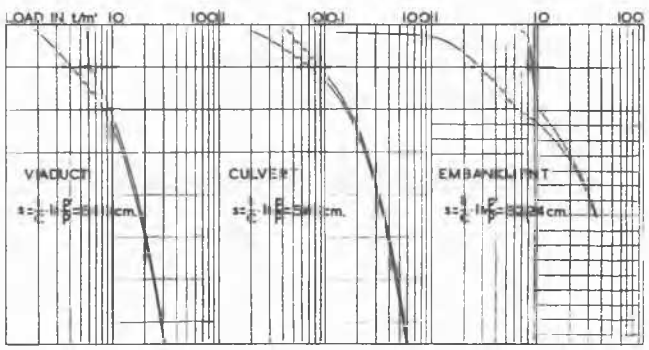


FIG. 5,6,7

Finally, in fig. 7 the ultimate subsidence of the viaduct was computed, which must be expected to be almost 7 cm.

In fig. 8 the time-settlement curves of the constructions and of the road-bed are shown. From these it appears that until August 1947 the 2 subsiding rods in the road-bed showed subsidences of 6 and 17½ cm. The form of the subsidence-curves makes it probable that the calculated figure for the subsidence will not be reached, so that in this case there is only

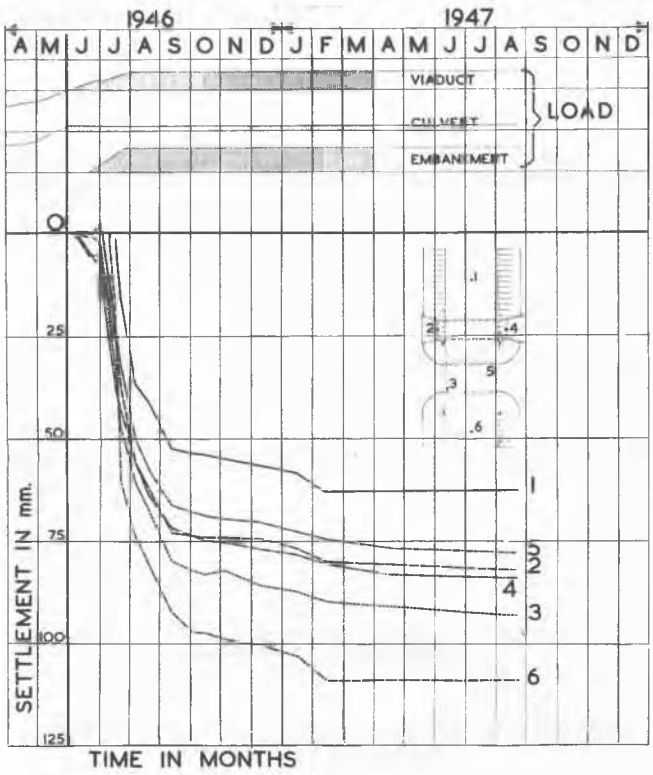


FIG. 8

a slight correlation between the calculated and the measured subsidences.

According to measurements the subsidence of the viaduct since building was commenced, appears to have been 9½ and 9¼ cm. This subsidence, therefore, is somewhat bigger than the calculated one, but the correlation may be called good.

Since the beginning of building the culvert appears to have settled 8½ cm which is more than the calculated subsidence. The correlation is also good.

As a conclusion it may be mentioned that the constructions show a reasonable correlation between the computed and the measured subsidences. The computed subsidence of the road-bed, however, surpassed the measured one some times.

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