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The bridge over the Nusle valley in Prague is a five-span framework, the length of the spans being 68,25, three-fold 115,50 and 68,25 meters respectively (1). Due to the arrangement of the intermediate supports it was possible to construct the load-bearing structure in one unit 485 meters long. The frame cross-beam is formed by a thin-walled bar having a closed cross section with two-side corbelled out footpaths (Fig. 1). The double level disposition made it possible for the underground to pass through the inside of the bridge. On the roadway there are placed two three-lane carriageways of the North-South expressway.

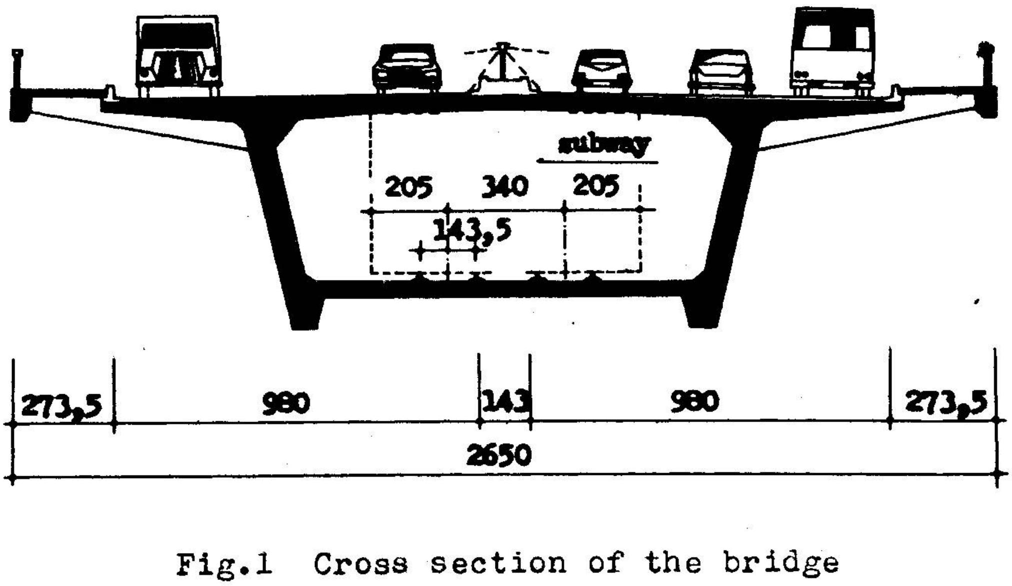

Fig.1 Cross section of the bridge

The composition of the concrete mixture was as follows:

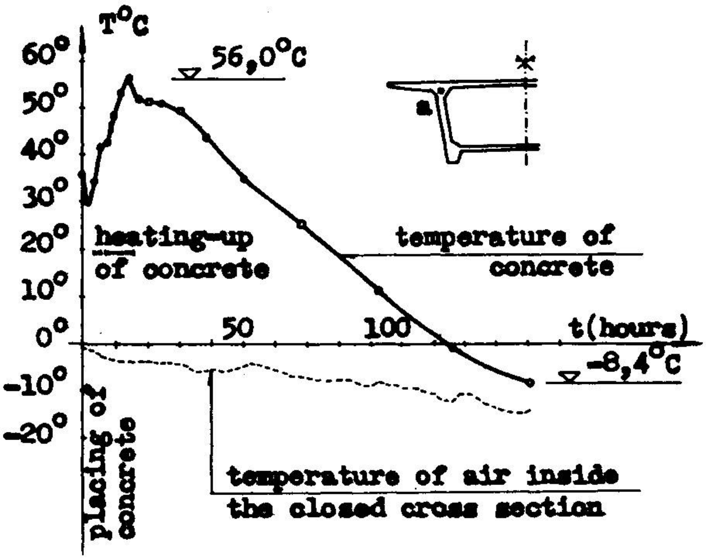

Fig.2 Time variation of temperature in point a

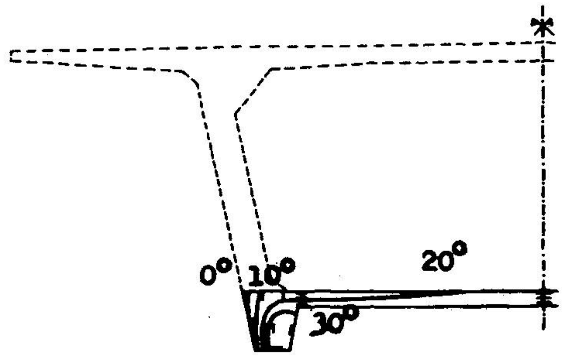

Fig.3

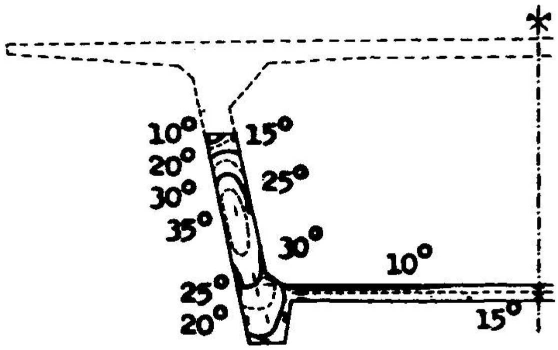

Fig.4

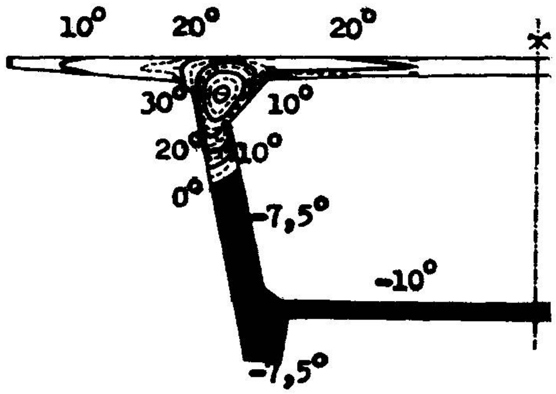

Fig.5

cement mark 450	425 kg
plasticizer S	2,8 l
water	150 l
aggregates	1845 kg

For temperature measurments 139 thermometers were placed during cantilever concreting the last two lamellas of the second span. From Fig. 2 the time variation of temperature after placing the concrete in the frame corner where the wall and the plate of roadway are connected (point a) in the middle of the last lamella can be seen. The maximum temperature measured was 56,0°C at the end of heating-up of concrete which was needed owing to severe frosts in December 1969. After 6 days the temperature in this point sank to 8,4°C below zero.

The lamellas of the load-bearing structure were concreted stage by stage so that after placing the reinforcement of the lower slab and walls the lower slab was concreted, after one day the concreting of the walls followed and after intermission of one week during which the falsework of the inner space was erected and the reinforcement of the roadway deck placed the floor system was finished. In Fig. 3 can be seen the temperature of concrete 10 hours after concreting the lower slab. Fig. 4 shows the temperature 20 hours after finishing concreting the walls and 44 hours after concreting the lower slab. The maximum temperature was measured in the centre of the wall by the value

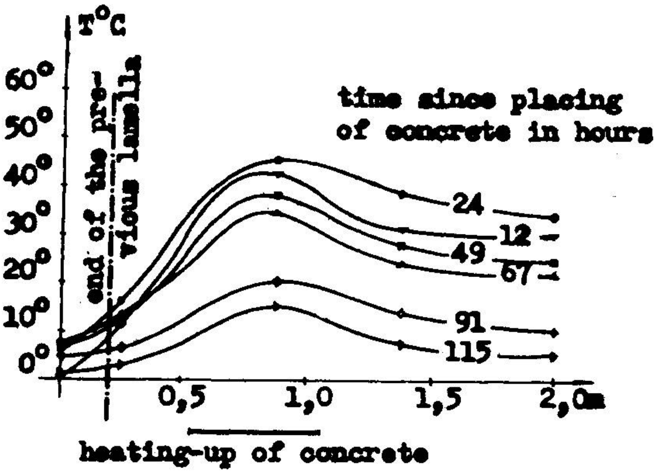

Fig.6

of 38,6°C. In Fig. 5 we can see the temperature one day after placing the concrete of the roadway plate and one week after finishing the concreting of the walls. The position of the thermometers can be seen too, marked by short commas. The grey part of the cross section already had the temperature below zero. The maximum temperature was measured in the centre of the frame corner (point a_0 in Fig. 2) and was 51,1°C while the air temperature inside the closed cross section was 8,4°C below zero. In Fig. 6 the variation of temperature of concrete in the wall in the longitudinal direction can be seen.

The results of measurments show the great effect of the heating-up of concrete in the time after the concrete was placed and the influence of the frozen concrete of the previous lamella.

References

1. Michálek,V., Bridge over the Nusle valley in Prague, publication for the Sixth FIP Congress in Prague, Práce, Prague, 1970.