

CONFERENCE ON HEAT TREATMENT OF CONCRETE  
STRUCTURES IN ELECTROMAGNETIC FIELD

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A conference on heat treatment of concrete parts and structures in electromagnetic field with low-frequency current was held in Minsk, June 5-6, 1973. The conference was sponsored by the section on heat and mass transfer in hardening of materials based on cement, Scientific Council of the State Committee of the Council of Ministers USSR on Science and Technology concerning mass and heat transfer in technological processes.

The conference was attended by 85 representatives from 32 scientific-research and planning institutes, enterprises, and organizations concerned with heat treatment of ferroconcrete structural members.

Professor S. A. Moronov, president of the section, gave a detailed analysis of existing methods of heating ferroconcrete parts and structures with electric current. He presented the historical development of heating methods, the effect of magnetization of water, the effect of sealing on the final structural-mechanical characteristics of ferroconcrete, the effect of magnetic field on the evenness of the temperature distribution in ferroconcrete parts and structures, and the areas of application and recommendations for using different methods of electrical heating.

Academician of the Academy of Sciences Belorussian SSR A. V. Lykov, director of the Institute of Heat and Mass Transfer (ITMO) of the Academy of Sciences Belorussian SSR, gave a report on heat and mass transfer and structural-mechanical properties of capillary-porous bodies during phase and chemical transformations in which he presented the latest scientific views of the process. He showed that the transfer of the bound substance in porous materials is determined to a considerable extent by their structures. The latter are characterized by homogeneity and anisotropy, concepts which are based on the probable distribution of permeability of elementary volumes of the porous substance. The permeability is described by a differential curve of the distribution  $f(k)$  similar to the differential curve of distribution of pores in the surface  $f_s(r)$ . The latest views were presented on the processes of evaporation, adsorption, and phase transformation. The effect of phase and chemical transformations on the structural-mechanical properties of capillary-porous substances such as building materials were also discussed.

V. G. Kamenskii (ITMO) gave a report on heat treatment of ferroconcrete parts in electromagnetic field. Experimental work on the process of electromagnetic treatment and design work on electromagnetic apparatus of various types for commercial use have been done at the Institute of Heat and Mass Transfer (ITMO). Unlike the steam process, the transfer of heat to concrete in electromagnetic chambers occurs by conduction from the form on the outside and from the reinforcing steel on the inside, which produces a fairly even temperature field and greatly accelerates the heat treatment process. The use of electromagnetic apparatus permits automation of the process, improves the working conditions, and reduces the corrosion of metal forms and structures in the shop. At the present time four commercial electromagnetic apparatus are in operation, three others are in the final testing stage, four are being built, and eight are in the planning stage. The savings resulting from the use of the electromagnetic apparatus have exceeded expectations and amount to 2 or more rubles per  $m^3$  of ferroconcrete, and the recovery of capital outlays for the apparatus will fall within the norm.

V. M. Krasnovskii (Moscow Institute of Steel and Alloys) gave a report on induction heating of assembled and monolithic ferroconcrete structures. He presented the basic engineering calculations for determining the inductance and the distribution of magnetic field intensity for inductors of rectangular section and also presented practical data on the induction process for heat treating ferroconcrete structures and parts in chambers of the slot type.

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A. I. Li (NIIZhB: Scientific-Research Institute of Ferroconcrete) discussed commercial apparatus for heat treatment of concrete parts in electromagnetic field, noting that in comparison with the steam process the heat treatment is shorter, with less expenditure of energy per  $m^3$  of concrete treated, the quality of the parts improves, and the working conditions improve.

There were seven reports given in section meetings, and discussions by 11 members.

The delegates inspected a commercial apparatus for electromagnetic heat treatment of ferroconcrete parts at the Minsk DSK-3, Minpromstroi BSSR.

It should be noted that the method of heat treatment of ferroconcrete parts in electromagnetic field was developed at the Institute of Heat and Mass Transfer of the Academy of Sciences BSSR.

It was resolved that theoretical and experimental studies of electromagnetic heat treatment of ferroconcrete parts be pursued in academic, industrial, and educational institutes. These studies will be coordinated by the Institute of Heat and Mass Transfer.

After completion of the research and review of the practical experience it will be expedient for the scientific council of the state committee to consider broad introduction of the induction process for heat treating ferroconcrete.