

UNITED STATES PATENT OFFICE

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METHOD OF ACCELERATING THE HARDENING OF PLASTIC MATERIALS

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The main objects of this invention are to provide an improved method of accelerating the hardening of concrete, mortar and similar coalescent material; and to provide an improved method of this kind which will require only a very small amount of apparatus.

The most common method heretofore in use for the hardening of concrete and similar material has been to merely permit the mass to stand untouched until it has properly set. Such a method has been very objectionable because it consumed a comparatively long time and required very favorable atmospheric and temperature conditions. Concrete, for instance, usually requires twenty-eight days under favorable temperature conditions for attaining that degree of strength which is necessary for construction work.

The improved method which we have discovered greatly accelerates the time required for the proper hardening and produces a more favorable temperature condition in the mass than that obtained heretofore.

Our improved method primarily consists in passing an electric current, preferably alternating current, through the plastic mass. By reason of the heat generated in the mass by the electric current, the setting is greatly accelerated. As a result of many experiments, we have determined that with this improved method, after the mass has been subjected to the electric current for only a few hours, it reaches a degree of coalescence which is almost seventy per cent. as great as it would be after a period of twenty-eight days of hardening with prior methods.

In carrying out this invention, the concrete or other substance is poured into the mold. The mold must be provided with electrodes placed in any suitable position within the mass. If the concrete is provided with the customary metal reinforcing bars, such bars may be used as the electrodes.

With this improved method, it is possible to definitely control the hardening process by regulating the electric current while observing the temperature and electrical resistance of the mass. During the hardening

process, the electrical resistance of the mass increases steadily. Therefore, the resistance of the mass at any given moment will indicate the progress of the hardening.

During the use of this improved method, the current distribution in the mass is such that the hardening process is uniform throughout every part of the entire mass. The reason for this is that, if the current distribution is not uniform throughout the mass, as for instance when the electrodes are not properly placed, the part subjected to the greatest current will have the highest temperature and consequently the highest electrical resistance because the resistance increases with the temperature. The current will therefore flow toward the portions of less resistance with the result that those portions will rise in temperature, thereby tending to preserve a uniform temperature throughout the entire mass. This uniformity of temperature throughout the entire mass has not been attainable with prior methods of hardening.

In carrying out this invention, it may be desirable to use metal plates as electrodes while in other cases it may be desirable to employ the concrete reinforcing bars.

Substantially the only apparatus which is necessary to carry out this improved process comprises a transformer, conductors, and electrodes, which are much cheaper to acquire and maintain than the boilers, pipe systems, steam chambers, etc., used in other methods.

Experiments have shown that the consumption of electricity in carrying out this method is between thirty and fifty Kwh. per cubic meter of mass.

If desired the molds may be heat insulated and also covered to prevent evaporation of the water.

We claim:

The method of accelerating the hardening of a plastic mass having water therein which consists in passing an electric alternating current therethrough.

Signed at Harnosand, this 27th day of March, 1930.

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