CLAIMS

1. A method for controlling work performance of fresh concrete based on regulation and control of a pouring construction performance objective, characterized in that, the method comprises the following steps:

step (1) carrying out a time-dependent test on work performance of fresh concrete under various working conditions to obtain time-varying data of the work performance of the concrete: preparing the concrete at a maximum daily temperature, a minimum daily temperature, and an average daily temperature corresponding to a location of a project, controlling initial expansion degrees of the concrete to be 650 mm, respectively, and performing the time-dependent test on the work performance of the concrete every 20 minutes to obtain expansion degrees of different time-dependent concrete under different conditions;

step (2) building a time-varying model for the work performance of the concrete based on different working conditions: performing least squares fitting on a time-dependent test result of the work performance of the concrete, and building the time-varying model for the work performance of the concrete based on the different working conditions, the time-varying model for the work performance of the concrete based on the different working conditions being as follows:

$$\mathbf{W(t)} = (\mathbf{aT} + \mathbf{b})t^2 + (\mathbf{cT} + \mathbf{d})t + \lambda$$

wherein $\mathbf{W(t)}$ is the expansion degree of the concrete corresponding to different time, and has a unit of mm; T is an environmental temperature under the different working conditions, and has a unit of °C; t is interval time between mixing and construction, which is an interval time from time when the concrete is poured out of a mixer to time when the concrete enters a pump truck for pumping or direct manual pouring, and has a unit of min; λ is the expansion degree of the fresh concrete, and has a unit of mm; and a, b, c, and d are temperature correlation coefficients; and

step (3) according to the different working conditions and a work performance control indicator of a construction node, determining relevant parameters of the time-varying model for the work performance of the concrete, and calculating a work performance control indicator of the fresh concrete: determining the temperature T of the current working condition, the interval time t between mixing and construction, and the expansion degree $\mathbf{W(t)}$ corresponding to the best work performance of the concrete required for construction, substituting the environmental temperature of the current working condition, the interval time between mixing and construction, and the

target expansion degree into the model, and calculating the expansion degree λ of the fresh concrete capable of making the concrete reach the target expansion degree during construction under the condition of the interval time.

2. The method for controlling work performance of fresh concrete based on regulation and control of a pouring construction performance objective according to claim 1, wherein the construction node for the concrete is a time node when the concrete is transported to a construction platform and begins to be poured from a tank truck into a pump truck for pumping or direct manual pouring.

3. The method for controlling work performance of fresh concrete based on regulation and control of a pouring construction performance objective according to claim 1, wherein the environmental temperature under the different working conditions is the environmental temperature during concrete transportation, construction and other processes under different weather and sunshine conditions.

4. The method for controlling work performance of fresh concrete based on regulation and control of a pouring construction performance objective according to claim 1, wherein the work performance control indicator of the fresh concrete is a control requirement of the work performance of the concrete at concrete mixing completion time when the concrete can achieve reasonable work performance during construction in a time-varying manner under the action of the temperature.