

# A STUDY ON THE USE OF WEATHER INFORMATION IN CONSTRUCTION SCHEDULE MANAGEMENT

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**ABSTRACT:** Recently, the abnormal climatic changes have been frequently occurred all over world. Construction work is heavily affected by weather because it is mostly performed outdoors unlike other industries. But construction schedule management is not considered by weather in many construction sites and construction work relied on the experience and subjective point of view by superintendent of construction site. That's why the delay of construction is frequently occurred. In order to recovery the delay of construction period, Construction Company carries out their construction by force to reduce the construction period so, poor construction, low quality, negligent accident are occurred. In order to solve these problems, basic study is to be carried out with analysis data of existing study and application of weather information.

**Keywords:** *Delay of Construction Period, Process Management, Weather*

## 1. Introduction

### 1.1 Background and purpose

Korea is characterized by having four distinct seasons so, there are many climatic changes such as heat waves in summer or cold weather in winter.

Especially for the climatic elements such as temperature, rainfall, snowfall, etc, these are most closely related to delay of construction period among other unpredictable elements. Consequently, some of clients including the Korea Housing, they compensate for the delay damage of construction period if there is delay of construction period due to the weather. But the increased construction cost is generally transferred to Construction Company in the most of private construction work. [Minchul Han 2010] In spite of these disadvantageous conditions, estimate of construction period depends on the experience and subjective judgment of superintendent so it causes the problems such as delay of construction period and low quality, etc. If construction work is planned in consideration of weather, it can prevent the delay of construction period and increase of prime cost. Also it reduces the damage and increases the profits. Therefore, this study proposes the method of using weather

information of temperature, rainfall and snowfall for construction schedule management.

## 2. Theological Consideration

### 2.1 Consideration of existing studies

The climatic elements and its related existing study in Korea are described as below table 1. It contains the estimate of non working day and estimate of construction period, evaluation of productivity, etc by using weather information of the past.

**Table1. Existing studies**

Researcher	Year	Contents
Bongchul, Choi	1999	Suggestion of deciding the time for reduction of construction period and commence of construction in consideration of regional climatic characteristics when estimating the construction period of apartment
Seoknam Jung	2000	Suggestion of making decision model of estimate of construction period with calculating non-workable days by simulation by analysis and statistics for each climatic factors affected in unit

		process
Sintae, Kim	2004	Suggestion of result of climatic factor by regression analysis for past 30 years with correlation between climate and productivity as basic data of management for type of construction in the process of reinforcing bar concrete frame work of apartment house
Jonghyun Shin	2005	Estimate of non-workable days focusing on the Incheon by analysis of affect of climatic factors on the construction period
Heeman, Chae	2007	Analysis of non-workable days by regression analysis of temperature in Seoul for 46 years
Jaewon Shin	2007	Estimate of frame work period by simulation of virtual climate with method for estimate of construction period by climatic information for high-rise building

### 3. Climatic elements and process management

#### 3.1 Climatic elements for construction work

Weather is called standby status ranged over the times and days in random time and place. There are rainfall, temperature and wind in major influence factor for construction.

Climate has various influences for each element in construction work. Characteristics for each climatic fact should be understood and correlation with work elements should be considered and applied because there are many differences depending on the location and method of work and etc.

##### 3.1.1 Rainfall

Rainfall has various influences in each work site. The work is divided into indoor and outdoor construction site.

Indoor construction such as interior finishing work or equipment construction, etc has little influences by rainfall but, but construction is not available especially in earth work, ground work and frame work.

Table 2 Non-workable rainfall

	Specification
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The Korea Housing	Over 10mm of rainfall per day
U.S Army Construction Work	Over 5mm of rainfall per day
Industry Safety Standards	Over 1mm per hour

#### 3.1.2 Temperature

If the temperature is below 0°C, frozen cement has bad influence on the hardening of cement. Also, it affects the form remaining period when the temperature is between 0 to 10°C.

If the temperature is over 25°C, it can cause the quality problem in concrete placing and low productivity in frame work and partial finishing work can be lower when it's high temperature in the afternoon. Or it can be not workable as well.

Table 3. Non-workable temperature

	Standard of low temperature	Standard of high temperature
The Korea Housing	Cold weather concrete when it's below 4°C for daily average temperature	Hot-weather concrete when it's over 25°C for daily average temperature
U.S Army Construction Work	Below 0°C for daily average temperature	
the Korea Highway Corporation	Below 4°C for daily average temperature	Over 35°C for daily average temperature

#### 3.1.3 Wind

The non-workable standard by wind is as below and it is defined in Industrial Safety Standard.

Table 4. Non-working figures by wind speed

	Specification
Industry Safety Standards	Over 10m/s for maximum speed of wind

#### 3.2 Process management of construction work

As for the plan of construction in construction work, it can be defined that it is to construct the buildings safely with minimum cost within given construction period based on the design book. During this process, most basic plan is

process management. The direct purpose of process management is to secure the period of construction.

Construction can be carried out or suspended in accordance of weather. So, weather should be predicted when setting up the construction plan.

#### 4. Conclusion

This study is to consider the estimate of non-working days and estimate of construction period, evaluation of productivity based on the existing studies. There have been many efforts to use the climatic information in process management but it ends up using only previous data. This is basic study to the system managing the construction by using the climatic information at the construction stage in real time in order to improve this issue.

The influence of accumulated weather information, the development of system by analysis of actual cases and the specification defined by various public organizations and private companies on construction work needs to be reviewed.

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