Modeling Cost Rate for Safety Management in Building Work

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Abstract

Questionnaires have been distributed to the engineers who are currently working at building construction sites. The survey result has been introduced to determine reasonable cost for safety management. Questionnaire contains items that safety managers are asked for which one is reasonable question, in the survey. Throughout this survey, rate dependant variable, amount size independent variable are established for regression analysis to derive a model. It is found that significant level. Therefore, nonlinear regression model is shown. In the study, it is considered that safety cost rate is decreased, while with amount being increased.

It is analyzed how much safety cost the field managers actually uses at their construction sites, based on site and amount of each project. Respondents are limited to the field engineers who have more than five year field experience. And responding items having many errors have been removed. They are classified as shown on in table(4). The items are questioned in the range of floor level such as 10th or less, 15fl, 20fl, 25fl, 30fl, 35fl, 40fl, 50fl, 53fl, more than 50fl: buildings in one site such as less than two, 2~5bdgs, 5~10, 10~15, 15~20, 20~25, 25~30, 30~35, 35~40, for more than 40bdgs; project amount such as ten million USD, 20 million USD, 30 million USD, 50 million USD, 100 million USD, 200 million USD, 300 million USD, 400 million USD, 500 million USD, more than 500 mil lion USD.

The existing statistic package program was used for extracting out the most reasonable regression equation appropriate for the rate of each project. It is shown that results from multi regressions analysis deviated from significance level and correlation ship, so that they can not be put into practical use. And, divergence shape shows that they can be reasonable as shown in table 3. Another approach general method also has been introduced to the study in order to verify the reasonability of the previous one.

It is shown that the new formula that encompasses the variables of building sizes and floors can not be reasonably applied to practical field situation due to the actual cost discrepancies at sites. They are the reasons why there might be many buildings with usually more than ten stories high. Therefore, safety management

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cost can be considered more practical, rather than theoretical. It is thought that only project amount based equation with r square 98.5 and p value 0.0000 can be applied to determine safety management cost for building work.

More verification using current rate system has been made in order to compare and analyze as shown in determination model of safety management cost by each project type. First, each project amount on the questionnaire survey has been used in verifying the model which is made in the study, such as 100 billion USD or less, 200 billion USD, 300 billion USD, 500 billion USD, trillion USD, 2 trillion USD, 3 trillion USD, 4 trillion USD, 5 trillion USD, 8 trillion USD. For example, rate comparison between current one and new system for such as apartment, office, hospital, mart buildings are shown in table 10 in the building work.

The first questionnaire survey contains size, number of floors and buildings and project amount of apartment building, office building, in making new modes. Simple and multi regression equations have been made to verify their practical efficiency, using two apartment project cases (15, 20 stories) and one office building with 58 stories. Generally, Excel function equations have some errors when they are practically verified. But it is proved that the applicability of log functions is practical. It is analyzed that the existing rates do not satisfactorily cover needs in the actual field situation. Current rates consider only project type without consideration of independent variables of project amount, size efficiently.

Some conclusions are summarized as follows: It is found that estimation model, based on the project amount rather than size as shown on the current cost rate system, can be more useful and significant, statistically and practically. Buildings such as apartment, office building and hospital, should be classified as a new group for application a new model of cost rate in accordance with occupational safety and health law. Modification on the existing rate should reflect a sense of reasonability. New models can be alternatives of the existing one.

Keywords: Cost Rate, Safety Management, Building Work

1. INTRODUCTION

Questionnaire Survey has been distributed to the engineers who are working at building construction sites, currently. This result has been introduced to determine reasonable cost for safety management.

Questionnaire contains the item that safety manager ask, think reasonable, for survey.

Though this survey, it is established that rate is dependant variable amount size are independent variable for regression analysis to derive a model. It is found that significant level. Therefore, nonlinear regress model is shown. In the study, it is considered that safety cost rate is decreased, varying with amount being increased.

2. Questionnaire survey

2.1 Survey

It is asked how much safety cost the field managers actually used at their construction sites, based on site, amount of each project. Responders are limited to the field engineers who have more than five year field experience. And responding items having much more error have been removed. They are classified as shown on table (4).

The items are questioned in the range of floor size such as 10th or less, 15fl, 20fl, 25fl, 30fl, 35fl, 40fl, 53fl, 50fl, more than 50fl; buildings in one site such as less than two, 2~5bldgs, 5~10, 10~15, 15~20, 20~25, 25~30, 30~35, 35~40, more than 40bldgs;