QUANTITATIVE APPROACH FOR ESTIMATION OF RESIDENTIAL BUILDING

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ABSTRACT

Cost estimation is the most important preliminary process in any construction project. Therefore, construction cost estimation has the lion's share of the research effort in construction management. In this paper, we have analyzed and studied proposals for construction cost estimation for the last 10 years. To implement this survey, we have proposed and applied a methodology that consists of two parts. The first part concerns data collection, for which we have chosen special journals as sources for the surveyed proposals. The second part concerns the analysis of the proposals. To analyze each proposal, the following four questions have been set. Which intelligent technique is used? How have data been collected? How are the results validated? And which construction cost estimation factors have been used? From the results of this survey, two main contributions have been produced. The first contribution is the defining of the research gap in this area, which has not been fully covered by previous proposals of construction cost estimation. The second contribution of this survey is the proposal and highlighting of future directions for forthcoming proposals, aimed ultimately at finding the optimal construction cost estimation. Moreover, we consider the second part of our methodology as one of our contributions in this paper. This methodology has been proposed as a standard benchmark for construction cost estimation proposals.

Keywords*: Building cost estimation, cost models, building functional elements, cost database, computer-aided cost estimation.*

1.Introduction

As the industrial development directly affects the construction sector, the projects are getting more complicated and their scales are getting larger. Hence it is getting more difficult to complete the projects within quality standards, budgeted cost limits and on time. The risk and uncertainties met by managers during the construction process result in some difficulties, thus the decisions to be taken may be delayed. One of these difficulties is caused by the lack of cost data whenever needed and in demanded quality. Therefore, the budgeted cost limits are often exceeded. In building construction projects, the direct cost is often emphasized and it is underlined in the cost estimation and cost control studies as the direct cost generally is very high compared with indirect cost within the building cost. Besides, decisions on investment of building projects, owner's evaluation of bids prepared by contractors, calculation of the tender price of the contractors, cost control during the decisions on design are all bound to the correct or almost correct cost estimation.

CONCRETE	RATIO	TOTAL	CEMENT	SAND	AGGREGATE	VOLUME	DRY VOLUME (IN 54%)	CEMENT	SAND	AGG.
M20 CONCRETE	(1:1.5:3)	5.5.	1	1.5	3	1339.16	2062.30024	374.964	562.4	1125

CONCRETING CEMENT
1 BAG OF CEMENT= 0.035 CUM
NO. OF CEMENT BAGS REQUIRED = 10714 BAGS
SAND VOLUME REQUIRED= 562.4 CUM
AGGREGARTE VOLUME REQUIRED= 1125 cum

BRICK WORK MORTAR
VOLUME OF CEMENT= 133 CUM
1 BAG OF CEMENT= 0.035 CUM
NO.OF CEMENT BAGS REQUIRED= 3800 BAGS
SAND VOLUME REQUIRED= 532 CUM

| PLASTERING MORTAR (1:6) |
|---|
| TOTAL VOLUME= 158.61 CUM |
| VOLUME OF CEMENT= 158*1/7 = 22.6585714 CUM |
| VOLUME OF SAND= 135.951429 CUM |
| 1 BAG OF CEMENT= 0.035 CUM |
| NO.OF CEMENT BAGS REQUIRED= 648 BAGS |

BRICK
NO. OF BRICKS REQUIRED= 643758 NOS

STEEL
TOTAL VOLUME OF STEEL= 37.819 CUM
DENSITY OF STEEL= 7850 KG/CUM
WEIGHT OF STEEL= 296881.7562 KG

TILES
VOLUME OF TILES = 52.23 CUM
VOLUME OF TILE ADHESIVE = 12.21 CUM
VOLUME OF DRY ADHESIVE INCREASE 50%=18.32
DENSITY OF ADHESIVE= 1700 KG/CUM
MASS OF ADHESIVE = 31135.5 KG

RATES
RATE OF BRICK = 3.5 RS/BRICK
RATE OF CEMENT= 250 RS./BAG
RATE OF SAND= 16 (coarse) 20(fine) rs./kg
RATE OF AGGREGATE= 30 Rs./kg (20mm)
RATE OF TILE = 80rs/pc (250*250 mm)
RATE OF TILE ADHESIVE= 10 RS./KG
RATE OF STEEL= 40 RS/KG

2. Experimental Work
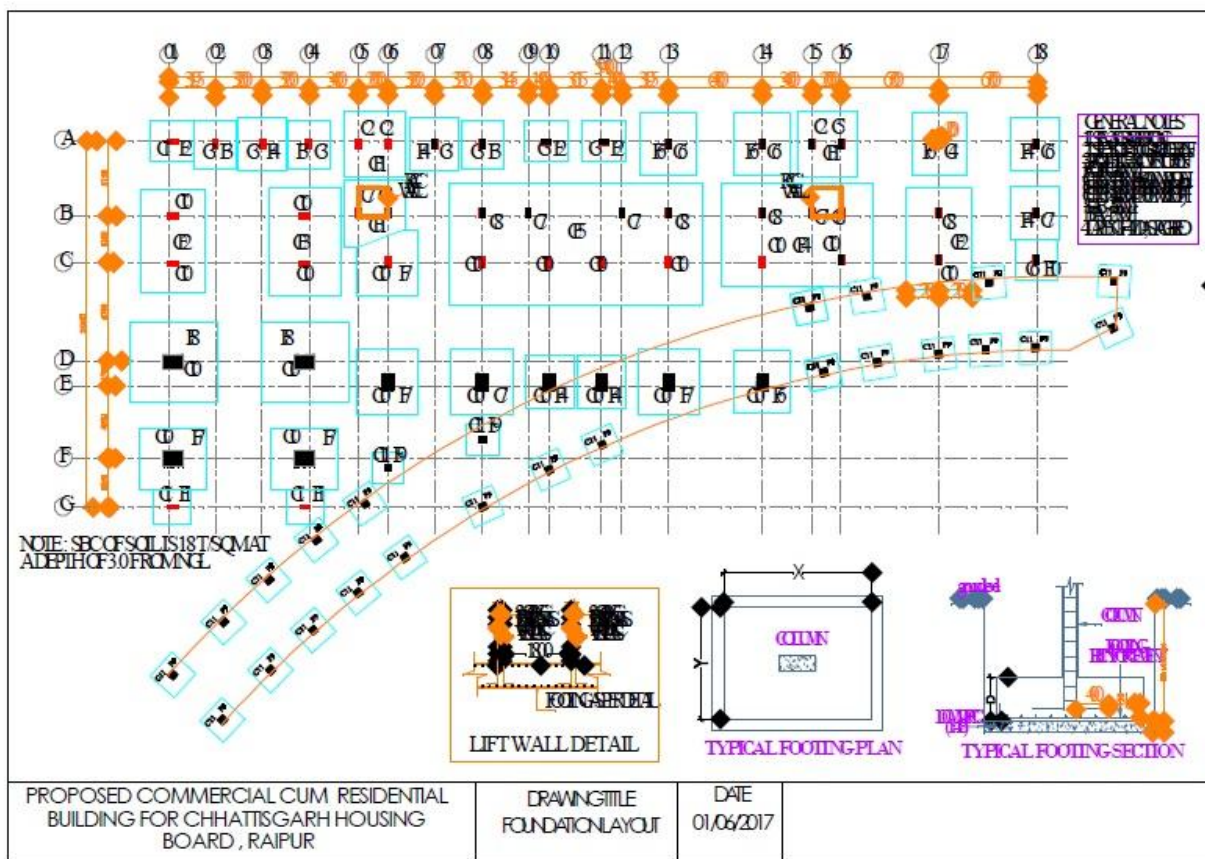
3. Conclusion

It is a well-known fact that up-to-date and reliable databases and information systems that support estimators are needed to make accurate cost estimation for different phases of the building construction process. Recent developments in information and communication technology enable to the development of such kinds of tools. However, the most important matter in cost estimation is the simplicity and applicability of the system to the factual cases. Cost estimation systems must be simple, reliable, flexible and convenient to the nature of the application area. The building cost estimation model based on functional elements helps the user to estimate the total building cost using historical data of the similar projects. Total building cost can be estimated in feasibility or in the schematic design phase depending on the detail level of project data available. Even in the case of knowing only the total construction area and number of storey of the project the user can estimate approximate total building cost. Even if the user has not sufficient project data, the model allows the user to make a project budget. The average quantities of the functional element. As the building materials to be used in the project can be modified, the user can see the total building cost difference between the first trial and the latter one accordingly. The model also allows estimating the most suitable total building cost even in the phase of the schematic design phase, as there is a chance of using more than one composite element alternative for each functional element group.

4. References

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