INTRODUCTION

Software development is a highly labor-intensive activity. A large software project may involve huge number of resources, overheads and it might carry for a span of years. Large software companies follow standardized or automated cost estimation techniques but small scale companies employ less than 100 resources, overheads are also comparatively less hence forth the project may not carry on for years, therefore the costs are tremendously less. This paper concentrates on small scale industry which employs only 10 resources and emphasis on manual software cost estimation method.

Manual estimates for software projects constitute the oldest form of software cost estimation and this method is still the most widely used. Manual phase-level estimates using ratios and percentages are another common and long-lived form of software estimation. Usually, the number of phases will run from five to eight, and will include such general kinds of software work as: (1) requirements gathering, (2) analysis and design, (3) coding, (4) testing, and (5) installation and training.

In Manual requirement phase, firstly the management bifurcates whether the client is domestic or international based, on this the estimation follows because the cost varies with domestic and international standards. Manual phase-level estimates usually start with an overall project-level estimate and then assign ratios and percentages to the various phases. Applying typical percentages for the five phases previously shown, you might next assume that requirements would comprise 10 percent of the effort, analysis and design 20 percent, coding 30 percent, testing 35 percent, and installation and training 5 percent. Converting these percentages into actual effort, you would arrive at an estimate for the project that showed the following:

### Table 1: Conversion of percentage into actual effort month

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Staff Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>2</td>
</tr>
<tr>
<td>Analysis and design</td>
<td>4</td>
</tr>
<tr>
<td>Coding</td>
<td>6</td>
</tr>
<tr>
<td>Testing</td>
<td>7</td>
</tr>
<tr>
<td>Installation</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

Scope of Software Cost Estimation

Accurate software cost estimates are critical to both developers and customers. They can be used for generating request for proposals, contract negotiations, scheduling, monitoring, and control. Underestimating the costs may result in management approving proposed systems that may exceed their budgets, with underdeveloped functions and poor quality, and failure to complete on time. Overestimating may result in too many resources committed to the project, or, during contract bidding, result in not winning the contract, which can lead to loss of jobs.

Accurate cost estimation is important because:
- It can help to classify and prioritize development projects with respect to an overall business plan.
- It can be used to determine what resources to commit to the project and how well these resources will be used.
- It can be used to assess the impact of changes and support replanning.
- Projects can be easier to manage and control when resources are better matched to real needs.
- Customers expect actual development costs to be in line with estimated costs.

Software cost estimation involves the determination of one or more of the following estimates:
- Effort (usually in person-months)
- Project duration (in calendar time)
- Cost (in dollars or Indian based on client)
Most cost estimation models attempt to generate an effort estimate, which can then be converted into the project duration and cost. Although effort and cost are closely related, they are not necessarily related by a simple transformation function. Effort is often measured in person-months of the programmers, analysts and project managers. This effort estimate can be converted into a dollar cost figure by calculating an average salary per unit time of the staff involved, and then multiplying this by the estimated effort required.

In the last three decades, many quantitative software cost estimation models have been developed. They range from empirical models such as Boehm's COCOMO models to analytical models. An empirical model uses data from previous projects to evaluate the current project and derives the basic formula from analysis of the particular database available. An analytical model, on the other hand, uses formulae based on global assumptions, such as the rate at which developer solves problems and the number of problems available.

Most cost models are based on the size measure, such as LOC and FP, obtained from size estimation. The accuracy of size estimation directly impacts the accuracy of cost estimation.

Although common size measurements have their own drawbacks, an organization can make good use of any one, as long as a consistent counting method is used.

A good software cost estimate should have the following attributes:
- It is conceived and supported by the project manager and the development team.
- It is accepted by all stakeholders as realizable.
- It is based on a well-defined software cost model with a credible basis.
- It is based on a database of relevant project experience (similar processes, similar tools, similar environments, similar people and similar requirements).
- It is defined in enough detail so that its key risk areas are understood and the probability of success is objectively assessed.

Many organizations uses series of cost estimates, we know many firms which deals the projects on large scale basis but this paper focuses on the small scale basis where the firm runs with 10 to 12 human resources, hence the product size and cost too reduces.

<table>
<thead>
<tr>
<th>Table. 2 Major factors that influence software cost</th>
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<tbody>
<tr>
<td>Programmer ability</td>
</tr>
</tbody>
</table>

**Model Approach**

Software cost estimation technique is basically carried out in this firm by the top management as well as the project manager. Including the factors which is listed above the firm has two types of clients, one is domestic other is international. Based on the requirement, product size and available time of the client they start analyzing the man days, human resources, overheads such as lighting, air-condition, electricity etc. Salary for the resources are fixed based on the experience, certification courses in project execution.

**CONCLUSION**

This model is followed over many number of years as the company turnover rate is very much limited, hence the company is following this technique since it got established and it's been exhibited successfully. This paper concentrates on basic cost estimation where in maintenance or changes in the scope of product are estimated separately. The above model of software cost estimation is carried out for domestic client only.

**REFERENCES**

