

**Terabyte Construction Co.**

**Renovation and remodeling Bid Generator:**

**External Documentation**

DSS Project: Fall 2005

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The Cost Estimation DSS built for Terabyte Construction Company simplifies and streamlines the bid process. Along with this our DSS will make modifying and preparing for each construction job easier. By using set parameters and interchangeable options we will be able to personalize each job with different products, account for all costs, and insert a markup percentage. This model-driven DSS will save time, money, and minimize errors in our bid process. Using knowledge of the market and current operations we will be able to choose to accept bids that make the most profit.

The intended user of our DSS will be a qualified Bid Specialist. This will be an employee who knows how to run our DSS and is able to go through a project with a customer to gather the needed information to insert into the system. By making the user interface easy to use, we will be able to train employees to use our DSS in very little time. Ultimately, this DSS would be known by every employee so that if many requests for renovations or remodeling come in we can bid them all.

The need for a model-driven DSS to help us decide on what to charge for a renovation or remodeling job came about from time and accuracy constraints. By visiting the location and/or speaking with the customer who would like to get a bid from our company, our Bid Specialists can take in data and come up with a bid in a small amount of time. This system will also accurately calculate cost factors that usually would take lots of time to group together and add up. Another benefit of our system is that it will provide detailed reports for our records and easy to read printouts for our customers.

Limitations to this DSS are that it is somewhat generalized. Our specification sheets are broken down into three general types of rooms; kitchen, bathroom, and general room. General rooms would be considered those needing few appliances or special features such as a hallway,

living room, or bedroom. Another limitation to our DSS is the amount of customization a customer is available to request.

The use of our system starts with a trained Bid Specialist. He or she will be contacted by the customer who is interested in our company providing renovation or remodeling services. Once a time is set up, the specialist will go to the location of the job to obtain the necessary inputs for the bid. First of all our DSS uses a form to take down critical information such as the start and completion date, the types of rooms, and the name and address of the customer (Figure 1). Next the specialist will take measurements and inquire about specific needs of the customer. These inputs are used by the system to calculate labor and material costs. The inputs are entered in to our specification sheets (Figure 2) and calculated.

Other inputs such as quality of fixtures and customization features will be put into the system along with measurements. Using all of these inputs our system will calculate the material and labor costs for the job. These costs will be added to other general job costs and a markup percentage to determine a final bid price. Other variables that our bid specialist will be able to change are the qualities and types of fixtures and features each job has. Flooring for example has many options such as tile, linoleum, or carpet. Each of these choices is further customizable by quality as premium, mid-grade, or budget. These features are made available for many items such as walls, bathroom fixtures, kitchen fixtures, and windows. (Figure 2).

At the end of the process, which at most could take a couple hours, our DSS system will set up printable reports. These reports will be used internally for feasibility studies (Figure 3) and externally by the customers (Figure 4). The internally uses report will summarized the costs so that they may be reviewed and maybe changed. If our company is very busy we may want to add a higher markup percentage to the bid before we send it to the customer. This way we will

be able to take jobs that give us the highest profit margin. The only way the useful customization features and printouts will be of any use is if the user is trained and can operate the DSS properly.

By making our DSS easy to use we should have very few problems training people to use and even modify it. If properly trained the Bid Specialists for our company could hypothetically add in special features with their corresponding costs to the DSS to even further customize the renovations and remodeling jobs. By using Microsoft Excel, we feel most people will be familiar with the screens and how to navigate through them. By using macros and command buttons users are provided shortcuts. The Bid Specialists are also required to input their name to the system to help organize our projects and to add further efficiency to our operations (Figure 1). This also adds security to our bids and provides accountability for jobs.

When building our DSS we started with a long list of materials and costs. To this we added labor costs. With the addition of customizable features we used reference tables to store our information in a place our system could easily pull the information from. The specifications sheet we built shows all our relevant measurement items and costs but in a detailed hard to read format. To fix this we added printout sheets that summarized the information. One of the most important parts of the project is the opening form. This is a basic form which takes input information and plants it into the specifications sheets and printouts. Command buttons and dropdown boxes also add ease of use and shortcuts for our users.

Other interesting features of our DSS are way it is used to validate data and to look up costs on its own. Data validation is built into the system to make sure that extra costs cannot be incurred. For example if someone chooses hardwood floors at a premium quality. Our system will only allow the customer to be charged for hardwood floors of premium quality. This cost is

input into the bid along with the cost of installing the hardwood floors, which would take longer than say carpeting. Our system also accounts for all data that goes into a job. Once the user puts in the dimensions of the room our DSS outputs the costs associated with drywall, studs, wall putty, labor, nails, sub-flooring, plates, insulation, and trim. To these any customizations change the costs by removing old costs and adding new costs affiliated with the item.

Another feature of our DSS is the use of reference tables. These hidden tables contain information about all of our materials and the cost associated with them. By using the VLOOKUP function of Excel, our system looks up these costs and puts them into each bid. By using dropdown boxes our system is made very easy to use and easy to modify. Further data validation is built in so that no conflicting costs or features are able to be built into a bid. These tables, given more time, could be expended drastically to include many more products.

The updating and modifications our system could handle are many. The use of reference tables leaves room for infinite customizations to be added in. If given more time, Bid Specialists could potentially link to catalogs of products for our customers to choose from. The DSS would need to have the costs of these items programmed into it though. If this customization would become a major area of our business a form could easily be written to add items to our reference tables, including their labor and material costs. Changing costs and inflation over years would also be easy to change in our system. For example if a certain type of countertop had prices raise from five to ten dollars per square foot, this change could be reflected by our DSS quickly and permanently changed by almost anyone who understood the system. This could become a problem of the system, unless a specific position is made to modify and update the DSS information.

Modifications such as this should be left to someone higher up in the company. Since the changing of materials and costs could drastically alter the outcomes of the bids, all of the cells containing this important information are hidden and locked. A supervisor or manager with the authority should be called upon to keep the system up to date, and make any necessary changes.

Problems with the DSS came from linking all our information together. At first we tried to copy buttons through workbook sheets which was causing confusion. We also tried to create multiple sheets at once off of our form. All this resulted in code errors and confusing operations. We tried to simplify everything to us to hopefully make the use of the system easier for everyone else who tries to use it. Problems could come from designing multiple rooms with multiple features, such as a room with hardwood and carpeted areas. To keep errors to a minimum and still get the benefits of accurate bids users should not try to overcomplicate it. Basically we have designed a system that looks up labor and material costs based on measurements or individual items and then adds these costs up.

The more simple the commands the better the DSS will work. If errors do occur, the bids will reflect the problems but it may be hard to detect or go undetected. This may mean losing money in some parts of a project and not even knowing it because the DSS is using the wrong cost for an item. Given the current state of the DSS any errors will come from changes made to the system or from incorrect inputs by the users.

The image shows a Microsoft Excel spreadsheet with a user form overlaid. The user form is titled "Terabyte Construction Company" and contains the following fields and buttons:

- Client's Name:
- Property Address:
- Client's Contact Number:
- Current Date:
- Completion Date:
- Name of Bid Specialist:
- Reset Form:
- Click Here When Finished:

The background spreadsheet has a blue and yellow color scheme. The text "Terabyte Co." is visible in the top left and right. The text "Remodeling and Renovation" is visible in the middle left. The text "Click Here To Generate" is visible in the bottom left.

Figure 1-User Form



Microsoft Excel - PROJECT

File Edit View Insert Format Tools Data Window Help

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Terabyte Construction Company - Customer Bid Summary

|                          |                             |  |
|--------------------------|-----------------------------|--|
| Client's Name:           | Tim Lanphier                |  |
| Property Address:        | 2504 College St.            |  |
| Client's Contact Number: | 712-253-7319                |  |
| Current Date:            | Monday, December 05, 2005   |  |
| Completion Date:         | Saturday, December 08, 2007 |  |
| Name of Bid Specialist:  | Jacob O                     |  |
| Total Cost:              | \$299.88                    |  |

Click to Print

Ready

start

GROUP 105 - Network...

Microsoft Excel - PROJECT

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Figure 3-Bid Printout