

Unit VI – Material Selection, Plan Reading, and Interpretation

Lesson I: Planning a Project

Carefully planning projects in agricultural mechanics saves time and money in the construction process. This lesson describes the steps in planning a project, from the factors to consider in selecting a project to preparing a thorough bill of materials.

Importance of Planning

The value of planning a project cannot be overemphasized. Workers that do not plan carefully get that sinking feeling when they discover that they have skipped a critical step, cut materials to the wrong size, or ran out of time to complete the project. Correcting mistakes like these can require working additional hours and spending more money on materials.

Carefully thinking through each step of a project before purchasing materials and beginning the work saves time, effort, and money. Understanding the value of thorough planning and how to do it are keys for preventing problems and frustrations when working on a project. It is important to closely review all of the plans, such as the design of the project and bill of materials, so that errors can be detected and corrected before beginning the work. Correcting the planning documents is much easier and less costly than correcting the project itself. Careful review of the planning documents may also uncover ways to improve the design or construction process.

Part of planning a project is deciding if the project is a good choice. Factors to consider when making this decision are discussed in the following section.

Factors for Selecting a Project

When deciding on a project, it is important to ask questions about various aspects of the project. Taking time to examine the factors below will help ensure a successful project.

- **Function:** The function of a project is its usefulness to the builder or person requesting the work. Builders

should ask if there is a particular need for the project and if the project will be functional as designed. For example, if the project is designed for outdoor use, are the materials listed in the plan weather resistant? Some projects may require design modifications to make them functional.

- **Procedure:** The procedure in a project includes all the skills needed to complete the work and their level of difficulty. Builders should evaluate their skills and ask if the project's procedures will require using skills they already have or learning new skills. If the skills required are challenging, they will need to decide if they are willing to put in the extra time and effort.
- **Appearance:** Drawings of the project provide information about its appearance and quality. A good design is eye appealing, balanced, and proportional. In addition, all the parts should work together.
- **Time:** Builders should ask when a project must be completed and if they can complete it within the allotted time. The difficulty of a project is an important factor in making scheduling decisions.
- **Cost:** Cost includes all the tools and materials that must be purchased for the project. Builders will need to estimate the cost and try to determine if there will be any hidden costs, such as tools required for a special procedure. They will need to decide if the cost of the project is within their budget. Some projects may not be a good choice because they require expensive materials or too many materials to be affordable.

Steps in Planning a Project

Basic steps in planning a project appear below. Reviewing these steps will help in getting an overall view of the planning process.

1. Choose a project. Make sure the project is the best choice overall by evaluating the factors listed in the previous section.
2. Make a working drawing, if none is available. Drawing the project on paper provides a picture of the overall design and might uncover potential problems.

Agricultural Mechanics

Possible sources for drawing ideas include agricultural mechanics textbooks, equipment and tool manufacturers, and the instructor. If plans from an outside source are chosen, be sure to show them to the instructor for approval before beginning the project.

3. Develop a plan of procedure. A plan of procedure lists the steps and materials required to build the project. Builders should have a thorough understanding of the project drawing before writing the plan of procedure. Writing the steps for building the project helps in thinking through the process and in determining what equipment and materials are required. In this step, it is important to consider all factors that could affect the project, such as purchasing special parts or tools, arranging for financing, and complying with building codes. The starting point of the plan of procedure will depend on the operations involved. For example, in a woodworking project, the most logical first step might be to cut lumber to required lengths. Grouping like operations together is a way to increase efficiency and reduce the number of equipment setups. For example, all crosscutting can be done at one time and then all rip cutting can be done. The information gathered in the plan of procedure is used in preparing a cutting list and bill of materials, which are described below.
4. Prepare a cutting list. A cutting list typically consists of the exact sizes and lengths of all materials that will need to be cut to size for a project. It is helpful to group materials with similar dimensions together. Grouping items together that can be cut from the same piece of stock helps save money and materials.
5. Prepare a bill of materials. A bill of materials is a list of all the materials required to build the project, including fasteners, finish, etc. Two common types of this list are called the construction bill of materials and the purchasing bill of materials. Both types list all the materials for a project; however, they are different in the following ways. The construction bill of materials

lists all materials in their final dimensions and can be used to prepare a cutting list. The purchasing bill of materials is developed based on the material sizes in the cutting list. It lists standard sizes of stock to purchase that will minimize waste and cost. The following is a sample cutting list and purchasing bill of materials for a bluebird house.

Cutting list:

- 1 - 16 1/2" x 1" x 6" pine board – back
- 1 - 9 3/4" x 1" x 6" pine board – front
- 1 - 6 1/2" x 1" x 6" pine board – roof
- 2 - 10 3/4" x 1" x 6" pine boards (ripped to 4") – sides
- 1 - 4" x 1" x 6" pine board (ripped to 4") – bottom
- 1 - 5 1/2" x 3/4" x 3/4" pine board – roof holder

Purchasing bill of materials:

- 1 - 5' x 1" x 6" pine board
- 20 - 6p (six-penny) finish nails
- 1 - 1 1/2" screw

6. Obtain all necessary supplies and have them readily available when needed. When the construction process is under way, looking for supplies and making numerous trips to purchase supplies takes precious time away from the project.

Summary

Thoroughly planning a project before purchasing materials and beginning construction saves time, effort, and money. Selecting a good project is one step in the planning process. Factors to consider when selecting a project include function, procedure, appearance, time, and cost. After the project has been selected, a plan will need to be drawn if a prepared plan is not available. After studying the drawing, a plan of procedure is then developed. This plan lists all steps and materials required in the construction process. From the plan of procedure, a cutting list and bill of materials are carefully prepared to make sure that all materials are purchased and available for the project.

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Credits

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