# CHAPTER 16

## Current Designs Excel Tutorial

**Using Excel® to Make Decisions at Current Designs**

**Topic(s):** **Preparation of a Flexible Budget**

**Excel® Functions and Tools: Copy tool; ABS function**

This document provides instructions that explain how to use Excel’s ABS function and Copy and Paste tool to complete the Current Designs problem that appears in the Chapter 16 worksheet template. A **What-if** question at the end of the solution will help you see how changes in one section of the worksheet can affect accounting information in other sections of the worksheet. Download the Excel file containing the Chapter 16 Excel Templates from the Wiley resources. It includes an Excel Template to use to solve the Current Designs problem.

### Problem Statement

The Current Designs staff has prepared the annual manufacturing budget for the rotomolded line based on an estimated annual production of 4,000 kayaks during 2027. Each kayak will require 54 pounds of polyethylene powder and a finishing kit (rope, seat, hardware, etc.). The polyethylene powder used in these kayaks costs $1.50 per pound, and the finishing kits cost $170 each. Each kayak will use two kinds of labor—2 hours of type I labor from people who run the oven and trim the plastic, and 3 hours of work from type II workers who attach the hatches and seat and other hardware. The type I employees are paid $15 per hour, and the type II are paid $12 per hour. This data is provided here.

| Kayaks budgeted for production in 2027 | 4,000 |  |
| --- | --- | --- |
| Kayaks produced in the first quarter | 1,050 |  |
| Budgeted unit costs |  |  |
| Polyethylene powder | $ 1.50 | per pound |
| Finishing kits | $170.00 | each |
| Type I labor | $ 15.00 | per hour |
| Type II labor | $ 12.00 | per hour |
| Budgeted labor usage |  |  |
| Type I labor | 2 | hours |
| Type II labor | 3 | hours |
| Polyethylene powder required per kayak | 54 | pounds |
| Finishing kits required per kayak | 1 | kit |

Manufacturing overhead is budgeted at $396,000 for 2027, broken down as follows.

| Variable costs |  |
| --- | --- |
| Indirect materials | $ 40,000 |
| Manufacturing supplies | 53,800 |
| Maintenance and utilities | 88,000 |
|  | 181,800 |
| Fixed costs |  |
| Supervision | 90,000 |
| Insurance | 14,400 |
| Depreciation | 109,800 |
|  | 214,200 |
|  | $396,000 |

During the first quarter, ended March 31, 2027, 1,050 units were produced with the following costs.

| Costs incurred in first quarter |  |
| --- | --- |
| Polyethylene powder | $ 87,000 |
| Finishing kits | 178,840 |
| Type I labor | 31,500 |
| Type II labor | 39,060 |
| Indirect materials | 10,500 |
| Manufacturing supplies | 14,150 |
| Maintenance and utilities | 26,000 |
| Supervision | 20,000 |
| Insurance | 3,600 |
| Depreciation | 27,450 |
| Total | $438,100 |

### Instructions

1. Prepare the annual manufacturing budget for 2027, if 4,000 kayaks will be produced.
2. Prepare the flexible budget for manufacturing for the quarter ended March 31, 2027. Assume activity levels of 900, 1,000, and 1,050 units.
3. Assuming the rotomolded line is treated as a cost center, prepare a flexible budget report for manufacturing for the quarter ended March 31, 2027, when 1,050 units were produced.

### What-If Question

Perform what-if analysis to answer the following:

Suppose the accountant identified an error in the number of kayaks produced and determined the actual production was 1,070 rather than the 1,050 kayaks. While the incurred costs given for the quarter ending March 31, 2027, were correct, the costs were for 1,070 kayaks, rather than the original 1,050 kayaks. Make changes in the flexible budget and the responsibility report to reflect the change to 1,070 kayaks. Indicate the differences observed in the report. Explain why some of the differences changed their respective favorable or unfavorable statuses.

### Solution Tutorial

Follow the following steps below to learn how to use Excel’s Copy and Paste tools and absolute value function to aid the preparation of flexible budgets for Current Designs’ managers. Save your file frequently while working.

#### Part 1

**Use sheet tab CD16 Part 1.**

**Part a.**

**Step 1:** Open the worksheet template file in Microsoft Excel. Save the file on your computer’s desktop. The data areas which appear in rows 15 to 26, 30 to 40, and 45 to 56 contain the data provided by Current Designs.

**Step 2:** Split your screen horizontally displaying approximately 6 rows in the top window.

**Hint:** Splitting the screen creates multiple windows in which each can be scrolled independently.

1. Scroll down the worksheet so that the first row displayed on your screen is row 15.
2. Select cell A21.
3. Select the **View** menu tab, and then choose **Split** from the **Window** group. A horizontal ‘split’ bar will appear just above row 21 creating two separate windows displaying different sections of the same worksheet.

**Step 3:** Place your cell pointer in the bottom window and scroll down. Select cell E87 and use a cell reference to the number of kayaks budgeted for production for 2027 in the data area.

**Step 4:** Use a cell reference in cell B90 to reference the name of the first variable cost—polyethylene powder—from cell C18 in the data area.

**Step 5:** Use the **Copy** tool to copy the cell reference in cell B90 to cells B91 to B93.

**Hint:** The **Copy** tool is used to copy specific contents or attributes from a cell or group of cells to other cells.

1. Select cell B90.
2. Use the mouse to point to lower right corner of cell B90.
3. When the pointer changes to a (+) plus sign, drag the cell contents to cells B91 to B93 by holding down the left mouse button.

**Step 6:** Use a cell reference in cell B94 to reference the name of the first variable manufacturing overhead cost—indirect materials—from cell C31 in the data area. Use the **Copy** tool to copy the cell reference in cell B94 to cells B95 to B96. The names of the other two variable manufacturing overhead costs will appear in these cells.

**Step 7:** In cell E90, input a formula with cell references to calculate the budgeted cost of polyethylene powder to produce 4,000 kayaks.

**Hint:** You may select the number of kayaks budgeted either from the data area or from cell E87.

**Step 8:** In cells E91 through E96, input a formula with cell references to the data area to calculate the budgeted cost of the finishing kits and both types of labor to produce 4,000 kayaks. Since the amounts of the three variable overhead costs are given in the data area, use a cell reference to the respective amounts in the data area..

**Step 9:** Use the **SUM** function in cell E97 to add the total budgeted variable costs. Verify that your work matches the solution that follows.

"An illustration shows an Excel spreadsheet with two columns. The first line displays Units to be produced, 4,000. The Costs section lists the variable costs and amounts budgeted as follows:
Polyethylene powder; Amount Budgeted, $324,000;
Finishing kits; Amount Budgeted, 680,000;
Type 1 labor; Amount Budgeted, 120,000;
Type 2 labor; Amount Budgeted, 144,000;
Indirect materials; Amount Budgeted, 40,000;
Manufacturing supplies; Amount Budgeted, 53,800;
Maintenance and utilities; Amount Budgeted, 88,000;
Total variable costs, $1,449,800."


**Step 10:** Use a cell reference in cell B100 to reference the name of the first fixed cost from the data area.

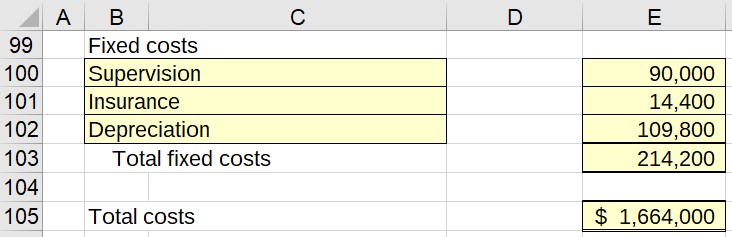
**Step 11:** Use the **Copy** tool to copy the cell reference in cell B100 to cells B101 and B102.

**Step 12:** Use a cell reference in cell E100 to reference the amount of the first fixed cost from the data area.

**Step 13:** Use the **Copy** tool to copy the cell reference in cell E100 to cells E101 and E102.

**Step 14:** Use the **SUM** function in cell E103 to add the total fixed costs.

**Step 15:** Use a mathematical formula in cell E105 to add the total fixed and variable costs. Verify that your work matches the solution that follows.



#### Part 1 b.

**Step 16:** In cell D115, use a formula with cell references to calculate the cost of polyethylene powder to produce 900 kayaks. Use a similar formula in cells E115 and F115 to calculate the powder costs at the 1,000 and 1,050 production levels.

**Step 17:** In cells D116, E116, and F116, use a formula and cell references to calculate the cost of the finishing kits to produce the respective number of kayaks in each column.

**Step 18:** In cells D117 through F118, use a formula and cell references to calculate the cost of both types of labor to produce the respective number of kayaks in each column.

**Step 19:** Use a formula and cell references to the data area in cells D119 to F121 to calculate the costs of the three variable overhead costs.

**Hint:** Because the individual unit costs are not given in the data area, you must calculate unit costs as part of your formula. For example, the indirect material cost is:

[Budgeted indirect material cost ÷ Budgeted kayaks] = $40,000/4,000 = $10

This budgeted unit cost is then multiplied by the respective number of kayaks to be produced. The formula in cell D119 will be: =D31/E15\*D112

**Step 20:** Use the **SUM** function in cells D122 to F122 to add the total variable costs.

**Step 21:** Use formulas and cell references in cells D125 to F127 to calculate the costs of the three fixed overhead costs from the data area.

**Hint:** Watch the time periods specified for the budgeted amounts in the data area compared to the quarterly budget periods in part b.

**Step 22:** Use the **SUM** function in cells D128 to F128 to add the total fixed costs.

**Step 23:** Use a formula in cells D129 to F129 to add the total costs. Verify that your work matches the solution that follows.

**"An illustration shows an Excel spreadsheet with variable and fixed costs listed. The table has four columns, with the first column displaying cost names and next three containing amounts. The Units to be produced are listed across the top with the first numeric column at 900; Second numeric column, 1,000; and Third numeric column, 1,050 units. The variable costs and their amounts are as follows:
Polyethylene powder: $72,900 for 900 units; $81,000 for 1,000 units; $85,050 for 1,050 units;
Finishing kits: 153,000 for 900 units; 170,000 for 1,000 units; 178,500 for 1,050 units;
Labor- Type 1: 27,000 for 900 units; 30,000 for 1,000 units; 31,500 for 1,050 units;
Labor-Type 2: 32,400 for 900 units; 36,000 for 1,000 units; 37,800 for 1,050 units;
Indirect materials: 9,000 for 900 units; 10,000 for 1,000 units; 10,500 for 1,050 units;
Manufacturing supplies: 12,105 for 900 units; 13,450 for 1,000 units; 14,123 for 1,050 units;
Maintenance and utilities: 19,800 for 900 units; 22,000 for 1,000 units; 23,100 for 1,050 units;
Total variable costs: 326,205 for 900 units; 362,450 for 1,000 units; 380,573 for 1,050 units.
The Fixed costs section displays the following: Supervision: 22,500 for all levels of units;
Insurance: 3,600 for all levels of units; Depreciation: 27,450 for all levels of units; Total fixed costs: 53,550 for all levels of units; 
Total costs is the Sum of Total variable costs and Total fixed costs which is: $379,755 for 900 units; $416,000 for 1,000 units; and $434,123 for 1,050 units."

**

#### Part 1 c.

**Step 24:** In cells D138 and E138, cell reference the number of kayaks produced in the first quarter from the data area.

**Step 25:** In cell D141, use cell references to the budgeted cost of polyethylene powder to produce 1,050 kayaks from the flexible budget in part b. Use a similar cell reference in cells D142 to D147 to reference the other budgeted variable costs from part b.

**Hint:** After cell referencing the polyethylene powder cost in cell D141, copy and paste the contents of D141 as formulas to cells D142 to D147.

**Step 26:** In cell D151, use a cell reference to reference the budgeted cost of supervision from the flexible budget in part b. Use a similar cell reference in cells C152 to C153 to reference the budgeted costs for the other fixed costs.

**Step 27:** In cell E141, use a cell reference to reference the actual cost of polyethylene powder to produce 1,050 kayaks. Copy and paste the contents of E151 as a formula to cells E142 to E147 to display the actual amounts for the other variable costs.

**Step 28:** In cell E151, use a cell reference to the actual cost of supervision from the data area. Copy and paste the contents of E151 to cells E152 and E153 to reference the other actual fixed costs.

**Step 29:** Use the **SUM** function in cells D148 and E148 to add the total variable costs, respectively.

**Step 30:** Use the **SUM** function in cells D154 and E154 to add the total fixed costs, respectively.

**Step 31:** Use the **ABS** function with cell referencing in the respective cells in column F of this budget report to calculate the absolute value of each variance.

**Hint:** Because variances should not be displayed as negative amounts, use the **ABS** function which displays your answer as the absolute value of the calculation.

1. To calculate the polyethylene powder variance, first select cell F141.
2. From the **Formulas** menu tab, choose **Math & Trig** functionsfrom the **Functions Library** group.
3. From the drop-down menu, choose **ABS** to display the **ABS** function dialog box.
4. Place your mouse pointer in the **Number** field, and immediate select cell E141.
5. Then press the “ – “ minus key and immediately select cell D141.
6. Click **OK** to close the dialog box. The absolute value of $1,950 will appear in the cell.

**Step 32:** Use the **Copy** and **Paste Formulas** tool to copy the formula in cell F141 to cells F142 through F148.

**Step 33:** Use the absolute value function in cell F151 to calculate the absolute difference between cells D151 and E151.

**Step 34:** Use the **Copy** and **Paste Formulas** tool to copy the formula in cell F151 to cells F152 and F155.

**Step 35:** Use the **SUM** function in cells D155 and E155 to add the total variable costs to the total fixed costs.

**Step 36:** Identify the nature of each variance by typing the letter ‘F’ if favorable or the letter ‘U’ if unfavorable in cells G141 through G148 and cells G151 to G155. Leave the cell blank for any variance that is zero.

**Step 37:** Verify that your work matches the solution that follows.

"An illustration shows an Excel spreadsheet with Production in units displayed across the top with budget and actual units at 1,050 columns. The variable cost names, the budget amount, the actual amounts, and the amount of the variance with a label of favorable or unfavorable are presented as:
Polyethylene powder: $85,050 budget; $87,000 actual; $1,950 U;
Finishing kits: 178,500 budget; 178,840 actual; 340; U;
Labor- Type 1: 31,500 budget; 31,500 actual; variance zero;
Labor-Type 2: 37,800 budget; 39,060 actual; 1,260; U;
Indirect materials: 10,500 budget; 10,500 actual; variance zero;
Manufacturing supplies: 14,123 budget; 14,150 actual; 28; U;
Maintenance and utilities: 23,100 budget; 26,000 actual; 2,900; U;
Total variable costs: 380,573 budget; 387,050 actual; 6,478; U;
The Fixed costs section displays as follows:
Supervision: 22,500 budget; 20,000 actual; 2,500; F;
Insurance: 3,600 budget; 3,600 actual; variance zero;
Depreciation: 27,450 budget; 27,450 actual; variance zero;
Total fixed costs: 53,550 budget; 51,050 actual; 2,500; F;
Total costs are the sum of total variable costs and total fixed costs and are: $434,123 budget; $438,100 actual; $3,978; U."


**Decision Analysis:** Evaluating managers by comparing costs allowed at the level of activity the manager achieved, in this case, at 1,050 units, provides a better evaluation of how well the manager performed. Upper-level management may wish to investigate the variance for polyethylene powder, the Type II labor variance, the maintenance and utilities variance, and the supervision variance, as these variances appear to be large contributors to the $3,978 net unfavorable variance for the quarter.

### What-if Solution

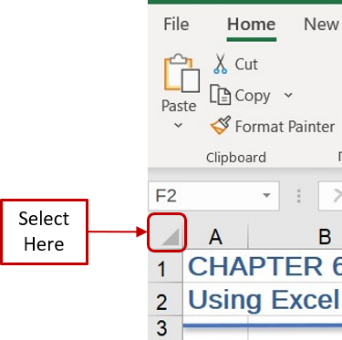
Once worksheet formulas are set up in Excel, you can perform what-if analysis to see the impact of the change under different scenarios.

#### Part 2

**Use sheet tab CD16 Part 2 What-if.**

**Step 1:** A blank worksheet named CD16 Part 2 What-if has been created for you. After completing part 1, copy the worksheet containing your solution and paste to the blank worksheet. To copy and paste:

1. On the worksheet that contains your solution, select the small triangle that appears to the left of the row A label and just above the label for row 1. You will see the entire worksheet dimmed to denote that the entire worksheet is selected.



1. Right click your mouse to display a list of options. Select **Copy**.
2. Select the **CD16 Part 2 What-if** worksheet tab.
3. Place your cell pointer in the same location on this blank worksheet as you did to copy in step **a.** above—i.e., the triangle to the left of the column A label and to the right of the label for row 1. Right click your mouse and select the first icon under the **Paste** options, labeled as **Paste (P),** to paste the contents. The worksheet should look identical to your original worksheet.

**Step 2:** Change the number of kayaks in cell E16 of the data area to 1,070. The costs in cells F115 through F122 should automatically change to reflect the costs allowed at the new level of activity.

**Step 3:** The amounts in the budgets should update automatically. Verify that part b now matches the solution that follows.

"An illustration shows an Excel spreadsheet with variable and fixed costs listed. The Units to be produced are listed above each numeric column at 900; 1,000; and 1,050 units. The variable costs and their amounts are as follows:
Polyethylene powder: $72,900 for 900 units; $81,000 for 1,000 units; $85,050 for 1,050 units;
Finishing kits: 153,000 for 900 units; 170,000 for 1,000 units; 178,500 for 1,050 units;
Labor- Type 1: 27,000 for 900 units; 30,000 for 1,000 units; 31,500 for 1,050 units;
Labor-Type 2: 32,400 for 900 units; 36,000 for 1,000 units; 37,800 for 1,050 units;
Indirect materials: 9,000 for 900 units; 10,000 for 1,000 units; 10,500 for 1,050 units;
Manufacturing supplies: 12,105 for 900 units; 13,450 for 1,000 units; 14,123 for 1,050 units;
Maintenance and utilities: 19,800 for 900 units; 22,000 for 1,000 units; 23,100 for 1,050 units;
Total variable costs: 326,205 for 900 units; 362,450 for 1,000 units; and 380,573 for 1,050 units.
The fixed costs section displays the following: Supervision: 22,500 for all levels of units;
Insurance: 3,600 for all levels of units; Depreciation: 27,450 for all levels of units; Total fixed costs: 53,550 for all levels of units; 
Total costs is the sum of total variable costs and total fixed costs which is $379,755 for 900 units; $416,000 for 1,000 units; and $434,123 for 1,050 units."


**Step 4:** Modify the favorable-unfavorable labels assigned to each variance in column G of the responsibility report (part c) that have changed because of the increase in the number of kayaks. Note that the flexible budget amounts in part c will be automatically updated because they contain formulas and cell references to the budgeted amounts in part b.

**Step 5:** Verify that your work in part **c** matches the solution that follows.

"An illustration shows an Excel spreadsheet and begins with  Production in units with the Flexible Budget at 1,050 and Actual costs at 1,050.. The first column contains names of costs, and other columns contain amounts.  The variable costs and their respective amounts for the flexible budget, actual costs and the difference labeled as U or F are as follows: 
Polyethylene powder: $86,670 flexible budget; $87,000 actual; $330 difference; U;
Finishing kits: 181,900 flexible budget; 178,840 actual; 3,060 difference; F;
Labor- Type 1: 32,100 flexible budget; 31,500 actual; 600 difference; F;
Labor-Type 2: 38,520 flexible budget; 39,060 actual; 540; U;
Indirect materials: 10,700 flexible budget; 10,500 actual; 200 difference; F;
Manufacturing supplies: 14,392 flexible budget; 14,150 actual; 242 difference; F;
Maintenance and utilities: 23,540 flexible budget; 26,000; 2,460 actual; U difference;
Total variable costs: 387,822 flexible budget; 387,050 actual; 772 difference; F;
The slightly indented data from the third section titled Fixed costs are as follows:
Supervision: 22,500 flexible budget; 20,000 actual; 2,500; F;
Insurance: 3,600 flexible budget; 3,600 actual; no difference;
Depreciation: 27,450 flexible budget; 27,450 actual; no difference;
Total fixed costs: 53,550 flexible budget; 51,050; 2,500; F;
Total costs (Sum of Total variable costs and Total fixed costs): $441,372 flexible budget; $438,100 actual; difference $3,272; F."


**Decision Analysis:** Two primary variances (differences) changed from unfavorable to favorable. Finishing kits initially showed an unfavorable variance of $340. The correction to the production of the number of kayaks allowed additional costs to be incurred for finishing kits resulting in a $3,060 savings (favorable). Maintenance and utilities resulted in an unfavorable difference of $2,460, up from the original $2,900 unfavorable variance. Other costs that showed unfavorable variances at 1,050 kayaks appear as much smaller unfavorable differences when the production level was changed to 1,070 units. No change in the amount of the fixed manufacturing costs occurred because total fixed costs allowed are the same at all levels of production. The net change went from a $3,978 unfavorable overall cost difference to a $3,272 favorable overall cost difference.

You may want to try some alternative changes in units, revenue, or costs to see how each change affects the total cost.