# CHAPTER 14

## Current Designs Excel Tutorials

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

**Topic(s): Incremental Analysis**

**Excel Functions and Tools: IF function**

This document provides instructions that explain how to use the IF function in a Microsoft Excel worksheet to solve the Current Designs that appears in the student file. 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 14 Excel Templates from the Wiley resources. It includes an Excel Template to use to solve the Current Designs problem.

### Problem Statement

Current Designs faces a few important decisions that require incremental analysis. Consider each of the following situations independently.

**Situation 1**

Recently, Mike Cichanowski, owner and CEO of Current Designs, received a phone call from the president of a brewing company. He was calling to inquire about the possibility of Current Designs producing “floating coolers” for a promotion his company was planning. These coolers resemble kayaks but are about one-third the size. They are used to float food and beverages while paddling down the river on a weekend leisure trip. The company would be interested in purchasing 100 coolers for the upcoming summer. It is willing to pay $250 per cooler. The brewing company would pick up the coolers upon completion of the order.

Mike met with Diane Buswell, controller, to identify how much it would cost Current Designs to produce the coolers. After careful analysis, the following costs were identified which include a modification of an existing mold to produce the coolers.

| Units desired by brewing company | 100 | coolers |
| --- | --- | --- |
| Costs of producing coolers: |  |  |
| Direct materials | $ 80 | per cooler |
| Direct labor | 60 | per cooler |
| Variable overhead | 20 | per cooler |
| Fixed overhead | 1,000 |  |
| Cost to modify existing mold | 2,000 |  |
| Amount to be paid by brewing company | 250 | per cooler |

### Instructions

1. Prepare an incremental analysis to determine whether Current Designs should accept this special order to produce the coolers.
2. Discuss additional factors that Mike and Diane should consider if Current Designs is currently operating at full capacity.

**Situation 2**

Current Designs is always working to identify ways to increase efficiency while becoming more environmentally conscious. During a recent brainstorming session, one employee suggested to Diane Buswell, controller, that the company should consider replacing the current rotomold oven as a way to realize savings from reduced energy consumption. The oven operates on natural gas, using 17,000 therms of natural gas for an entire year. A new, energy-efficient rotomold oven would operate on 15,000 therms of natural gas for an entire year. After seeking out price quotes from a few suppliers, Diane determined that it would cost approximately $250,000 to purchase a new, energy-efficient rotomold oven. She determines that the expected useful life of the new oven would be 10 years, and it would have no salvage value at the end of its useful life. Current Designs would be able to sell the current oven for $10,000. Data are presented here.

| Current oven operating data: |  |  |
| --- | --- | --- |
| Annual natural gas usage | 17,000 | therms |
| Expected current selling price | $10,000 |  |
| New oven operating data: |  |  |
| Annual natural gas usage | 15,000 | therms |
| Purchase price | $250,000 |  |
| Expected useful life | 10 | years |
| Expected salvage value | $ 0 |  |
| Average expected price of natural gas | $0.65 | per therm |

**Instructions**

1. Prepare an incremental analysis to determine if Current Designs should purchase the new rotomold oven, assuming that the average price for natural gas over the next 10 years will be $0.65 per therm.
2. Diane is concerned that natural gas prices might increase at a faster rate over the next 10 years. If the company projects that the average natural gas price of the next 10 years could be as high as $0.85 per therm, discuss how that might change your conclusion in part a.

**Situation 3**

One of Current Designs’ competitive advantages is found in the ingenuity of its owner and CEO, Mike Cichanowski. His involvement in the design of kayak molds and production techniques has led to Current Designs being recognized as an industry leader in the design and production of kayaks. This ingenuity was evident in an improved design of one of the most important components of a kayak, the seat. The “Revolution Seating System” is a one-of-a-kind, rotating axis seat that gives unmatched, full-contact, under-leg support. It is quickly adjustable with a lever-lock system that allows for a customizable seat position that maximizes comfort for the rider.

Having just designed the “Revolution Seating System,” Current Designs must now decide whether to produce the seats internally or buy them from an outside supplier. The costs for Current Designs to produce the seats are as follows. Having just designed the “Revolution Seating System,” Current Designs must now decide whether to produce the seats internally or buy them from an outside supplier. The costs for Current Designs to produce the seats, number of seats, and amount of fixed overhead to be avoided if seats are purchased are as follows.

| Costs to produce seats internally |  |  |
| --- | --- | --- |
| Direct materials | $20.00 | per seat |
| Direct labor | $15.00 | per seat |
| Variable overhead | $12.00 | per seat |
| Fixed overhead | $20,000 | per year |
| Number of seats needed | 3,000 | seats |
| Avoidable fixed overhead costs | 25% |  |
| Cost to buy seats from a supplier | $50.00 | per seat |
| Opportunity cost (part b) | $20,000 |  |

**Instructions**

1. Prepare an incremental analysis showing whether Current Designs should make or buy the “Revolution Seating System.”
2. Would your answer in (a) change if the productive capacity released by not making the seats could be used to produce income of $20,000?

### What-If Questions

Use the cost and revenue data in Situation 1. Current Designs has been approached by Dante Distribution Company that wishes to purchase 100 floating coolers for the same $250 per cooler price as offered by the brewing company. However, Dante wants the coolers to be made of composite material that is lighter in weight, but costs about 20 percent more than the original direct material cost estimated. If Dante accepts this order, there will be no need for the modifications to the existing mold. What effect with this new order have on Current Design's income? Which order is the better option--the brewing company or the Dante order? Additional data for this situation are presented here.

Cost increase in materials 20%

### Solution Tutorial

Follow the following steps below to learn how to use Excel’s IF function to aid decision making for Current Designs’ managers. Save your file frequently while working.

#### Part 1 Situation 1.

**Use sheet tab CD14 Part 1.**

**Step 1:** Open the worksheet template file in Microsoft Excel. Save the file on your computer’s desktop. The data area for situation 1 appears in rows 22 to 29.

**Step 2:** In cells D117 and E117, type mathematical formulas that cell reference amounts in the data area to calculate the revenue that will be earned if the order is rejected and accepted, respectively.

**Hint:** It is possible that revenue (or costs) may be $0 under either of the ‘accept or reject’ scenarios in an incremental analysis. Type the number 0 into any cell for which the amount will be zero. Depending on the number formatting, Excel may display zero amounts with a dash symbol, or display the numerical zero amount.

**Step 3:** Cell reference the names (such as direct materials) of the costs that are incremental for the decision into cells B109 to B123.

**Hint:** To cell reference the cost names, select cell B119 and press the equal symbol. Immediately select cell C24. The ‘Direct materials’ label will display in cell B119. Perform similar cell references to display the other cost labels in cells B120 through B123.

**Step 4:** Use mathematical formulas in cells D119 to D123 (if the order is rejected) and cells E119 to E123 (if the order is accepted) to calculate the respective costs by cell referencing amounts from the data area.Type the number “ 0 ” for any amounts that are zero.

**Step 5:** Use mathematical formulas in cells F117 and F119 to F123 to calculate the incremental effect of revenues and each of the costs.

**Hint:** Display amounts as negative that decrease net income, or positive if net income increases.

**Step 6:** Use the SUM function in cells D124 and E124 to calculate the total costs under both alternatives, and in cell F124 to calculate the incremental effect on total costs.

**Step 7:** Use a mathematical formula in cells D125 and E125 to calculate net income under both alternatives, and another formula in F125 to calculate the incremental effect on net income of the two alternatives.

**Step 8:** Verify your solution to part a appears as presented in the solution that follows.

**An illustration shows an Excel spreadsheet labeled part a with four columns. The first column displays line item labels and the next three contain numeric columns. The line items and amounts for the following, Revenues: Reject Order, Accept Order, and the net increase or decrease in net income are: 
Revenues: Reject order, Zero; Accept order $25,000; Net Income Increase, $25,000; Under the heading Costs: Direct materials: Reject Order, Zero; Accept Order, 8,000; Net Income Decrease, negative 8,000; Direct labor: Reject Order, Zero; Accept Order, 6,000; Net Income Decrease, negative 6,000; Variable overhead: Reject Order, Zero; Accept Order, 2,000; Net Income Decrease, negative 2,000; Fixed overhead: Reject Order, Zero; Accept Order, 1,000; Net Income Decrease, negative 1,000; Cost to modify existing mold: Reject Order, Zero; Accept Order, 2,000; Net Income Decrease, negative 2,000; Total costs: Reject Order, Zero; Accept Order, 19,000; Net Income Decrease, negative 19,000;  Net income: Reject Order, Zero; Accept Order, 6,000; Net Income Decrease, negative 6,000.
**

**Step 9:** Enter an **IF** statement using Excel’s **IF** function in cell F127 to advise Mike Chichanowski, the owner and CEO of Current Designs, if he should accept or reject the special order considering only the financial implications.

1. To use the **IF** function, first select cell F127 Select the **Formulas** menu ribbon.
2. From the **Formulas** option on the menu ribbon, choose **Logical**functions*.*
3. From the drop-down menu, choose IF to display the **IF** dialog box.
4. By default, your mouse pointer will appear in the **Logical\_test** field. Select cell F125, and immediately type >= (greater than and equal) symbols followed by the number 0.
5. Type “ Accept the order ” into the **Value\_if\_true** field. Type “ Reject the order ” into the **Value\_if\_false** field. Excel automatically adds quotation marks around each label.

**Step 10:** Verify your input matches the input in the dialog box that follows. Click the **OK** icon (or the **Done** icon) in the dialog box to close it. The label, Accept the order, should appear in cell F127.

**"An illustration of the IF Function Arguments dialog box contains three fields.
The first field is logical test with the contents as: F 125 is greater than or equal to 0. 
The second field is Value if true, with the contents as Accept the order in quotes. 
The third field is Value if false with the contents as: Reject the order in quotes.
The text below the if fields reads, equals Accept the order, followed by, Checks whether a condition is met, and returns one value if True, and another value if False; Logical test is any value or expression that can be evaluated to True or False."
**

The **IF** function is a powerful tool to aid decision-making. It tests to see if a given condition is true or false, and displays a different outcome based on the result of the ‘test’.

**Decision Analysis:** Based solely on financial considerations, Current Designs should accept the special order because net income is expected to increase by $6,000. Note that management will also want to consider qualitative issues as well.

**Step 11:** In the text area beginning in cell B131, identify any additional factors that Mike and Diane should consider if Current Designs is currently operating at full capacity.

**Decision Analysis:** Current Designs must first determine if it has the capacity to produce the coolers. If it displaced production of regular kayaks in order to fill this order, it would have to consider the opportunity costs associated with this decision. Current Designs’ opportunity costs are the lost contribution margin from regular sales given up in order to fulfill the special order. Rather than rejecting the special order, it might consider temporarily expanding the plant’s capacity by adding an additional production shift to handle the special order. If this option were considered, it would have to identify all additional incremental material, labor, and overhead costs that would be incurred.

#### Part 1 Situation 2 a.

**Step 12:** The data for Situation 2 appears in rows 49 through 57.

**Step 13:** In cellsD149 and E149, type mathematical formulas that cell reference amounts in the data area to calculate the variable manufacturing costs of retaining and replacing the oven for the 10-year period, respectively.

**Step 14:** Use a formula with cell references or single cell reference from the data area in cells D150, E150, D151, and E151 to display the respective costs.Type the number 0 for items with no cost.

**Step 15:** Use formulas in cells F149 to F151 to calculate the incremental effect on net income of each cost.

**Step 16:** Use the SUM function in cells D152 and E152 to calculate the total costs under both alternatives. Use the SUM function in cell F152 to calculate the net incremental effect on net income.

**Step 17:** Verify your solution appears as presented in the solution that follows.

**"An illustration shows an Excel spreadsheet labeled part A with four columns. The line item labels and amounts for Retain Oven, Replace Oven, and Net Income Increase (Decrease) are:
Variable manufacturing costs: Retain Oven, $110,500; Replace Oven, $97,500; Net Income Increase $13,000; 
New oven cost: Retain Oven, zero; Replace Oven, 250,000; Net Income Decrease, negative 250,000; 
Proceeds from scrapping old oven: Retain Oven, zero; Replace Oven, negative 10,000; Net Income Increase, 10,000; 
Total 10-year costs: Retain Oven, $110,500; Replace Oven, $337,500; Net Income Decrease, negative 227,000."
**

**Step 18:** Enter an **IF** statement using Excel’s **IF** function in cell F154 to advise Mike Chichanowski, the owner and CEO of Current Designs, if he should retain or replace the oven considering only the financial implications. Use the “ Replace the oven ” and “ Not replace the oven ” labels in the **Value\_if** fields.

**Step 19:** Prior to closing the dialog box, verify your input in the dialog box matches the input fields that follow. ‘Not replace the oven’ should appear in cell F154.

**"An illustration of the IF Function Arguments dialog box contains three fields.
The first field is logical test with the contents as: F 152 is greater than or equal to 0. 
The second field is Value if true, with the contents as Replace the oven in quotes. 
The third field is Value if false with the contents as Not replace the oven in quotes.
The text below the if fields reads, equals Accept the order, followed by, Checks whether a condition is met, and returns one value if True, and another value if False; Logical test is any value or expression that can be evaluated to True or False."
**

**Decision Analysis:** Based solely on financial considerations, Current Designs should not replace the oven because total costs over the 10-year period are expected to be $227,000 more than if the oven is replaced. Management will also want to consider qualitative issues as well.

#### Part 1 Situation 2 b.

**Step 20:** Follow the steps for part a to create a new incremental analysis with theprojected cost of each therm of natural gas at $0.85. Create the **IF** statement in cell F63 which displays ‘Replace the oven’ and ‘Not replace the over’ depending on the outcome. Verify your solution appears as presented in the solution that follows.

**"An illustration shows an Excel spreadsheet labeled part A with four columns. The line item labels and amounts for Retain Oven, Replace Oven, and Net Income Increase (Decrease) are:
Variable manufacturing costs: Retain Oven, $144,500; Replace Oven, $127,500; Net Income Increase $17,000; 
New oven cost: Retain Oven, zero; Replace Oven, 250,000; Net Income Decrease, negative 250,000; 
Proceeds from scrapping old oven: Retain Oven, zerol; Replace Oven, negative 10,000; Net Income Increase, 10,000; 
Total 10-year costs: Retain Oven, $144,500; Replace Oven, $367,500; Net Income Decrease, negative 223,000.
Text at the bottom reads, Based solely on financial considerations, Current Designs should, followed by a textbox that reads, Not replace the oven."
**

**Step 21:** Beginning in cell B166, discuss the effects of the change in natural gas costs on the decision faced by Diane and Mike.

**Decision Analysis:** Current Designs should still retain the oven as the cost differential changed by only $3,000. It would take a cost of approximately $12 per therm for natural gas to motivate Diane to replace the oven simply due to the cost of natural gas.

#### Part 1 Situation 3 a.

**Step 22:** The data for situation 3 appears in rows 82 to 90.

**Step 23:** Use a single cell reference or formulas with cell reference to amounts in the data area in cells D176 to E180 to calculate the costs to be incurred if the seats are manufactured (make) or purchased (buy).Some costs may be $0.

**Step 24:** Use a single cell reference or formulas with cell reference to amounts in the data area in cells F176 to F180 to calculate the incremental effect on net income of each cost.

**Step 25:** Use the **SUM** function in cells D181 and E181 to calculate the total annual cost under the alternatives, and in cell F181 to calculate the incremental effect on net income of the make or buy situation.

**Step 26:** Enter an **IF** statement using Excel’s **IF** function in cell F183 to advise Mike Chichanowski if he should make or buy the seats considering only the financial implications. Use the “ Make ” and “ Buy ” labels in the respective **Value\_if** fields.

**Step 27:** Verify your solution appears as presented in the solution that follows.

**"An illustration shows an Excel spreadsheet labeled part A with four columns. The line item labels and amounts for Make, Buy, and Net Income Increase (Decrease) are:
Direct materials: Make, $60,000; Buy, Zero; Net Income Increase, $60,000;
Direct labor: Make, 45,000; Buy, Zero; Net Income Increase, 45,000;
Variable overhead: Make, 36,000; Buy, Zero; Net Income Increase, 36,000;
Fixed overhead: Make, 20,000; Buy, 15,000; Net Income Increase, 5,000;
Purchase price: Make, Zero; Buy, 150,000; Net Income Decrease, negative 150,000;
Total annual cost: Make, $161,000; Buy, $165,000; Net Income Decrease, negative 4,000.
Text below reads: Based solely on financial considerations, Current Designs should. It is followed by a textbox that reads, Make."
**

**Decision Analysis:** Based solely on financial considerations,Current Designs should produce the seats internally because it will cost an additional $4,000 to buy from an outside vendor.

#### Part 1 Situation 3 b.

**Step 28:** In cells D187, E187, and F187, cell reference the Total annual cost and incremental net income amounts from part a.

**Step 29:** Input the effects of the opportunity cost into the respective cell in row 188 by cell referencing the amount from the data area.

**Step 30:** Use a mathematical formula in cell F188 to calculate the incremental effect of the opportunity cost.

**Step 31:** Use the SUM function in cells D189 and E189 to calculate the total cost under the alternatives, and in cell F189 to calculate the incremental effect on net income of the make or buy situation.

**Step 32:** Enter an IF statement using Excel’s IF function in cell F191 to advise Mike Chichanowski if he should make or buy the seats considering only the financial implications. Use the “ Make ” and “ Buy ” labels in the respective **Value\_if** fields.

**Step 33:** Verify your worksheet appears as presented in the solution that follows.

**"An illustration shows an Excel spreadsheet labeled part A with four columns. The line item labels and amounts for Make, Buy, and Net Income Increase (Decrease) are:
Total annual cost: Make, $161,000; Buy, $165,000; Net Income Decrease, negative 4,000;
Opportunity cost: Make, 20,000; Buy, zero; Net Income Increase, 20,000;
Total cost: Make, $181,000; Buy, $165,000; Net Income Increase, 16,000;
Text at the bottom reads, Based solely on financial considerations, Current Designs should, which is followed by another textbox that reads, Buy."
**

**Decision Analysis:** Based solely on financial considerations,Current Designs should buy the seats from an outside vendor because it will save $16,000 compared to producing the seats internally.

### What-if Solution

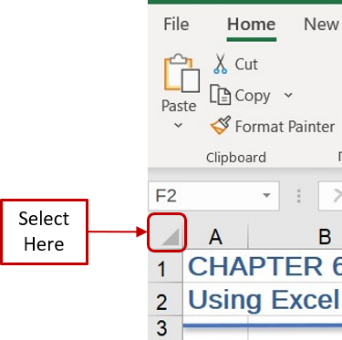
Once worksheet formulas are set up in Excel, you can perform what-if analysis to see the impact of the change under different scenarios.

#### Part 2

**Use sheet tab CD14Part 2.**

**Step 1:** A blank worksheet named CD14 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 **CD14 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:** Modify any costs that changed under this what-if scenario in the part a solution area. The output in the totals and in cell F127 which contains the IF statement should reflect the changes automatically.

**Step 3:** Verify your worksheet appears as presented in the solution that follows.

"An illustration shows an excel spreadsheet labeled (a) with four columns. The first column displays account names and the next three are numeric columns. The column headers for numeric columns are as follows: Reject Order, Accept Order, and Net Income Increase (Decrease). The data are as follows, Revenues: Reject Order, Nil; Accept Order, $25,000; Net Income Increase (Decrease), $25,000;
Under the head Costs: Direct materials: Reject Order, Nil; Accept Order, 9,600; Net Income Increase (Decrease), negative 9,600; Direct labor: Reject Order, Nil; Accept Order, 6,000; Net Income Increase (Decrease), negative 6,000; Variable overhead: Reject Order, Nil; Accept Order, 2,000; Net Income Increase (Decrease), negative 2,000; Fixed overhead: Reject Order, Nil; Accept Order, 1,000; Net Income Increase (Decrease), negative 1,000; Cost to modify existing mold: Reject Order, Nil; Accept Order, Nil; Net Income Increase (Decrease), Nil; Total costs: Reject Order, Nil; Accept Order, 18,600; Net Income Increase (Decrease), negative 18,600;  Net income: Reject Order, Nil; Accept Order, 6,400; Net Income Increase (Decrease), 6,400. 
Statement at the bottom reads, Based solely on financial considerations, Current Designs should, a textbox besides this read, Accept the order."


**Step 4:** Respond to the two questions in the text box that begins in row 130.

**Decision Analysis:** Based solely on financial considerations, Current Designs should accept the special order because net income is expected to increase by $6,400. The order from Dante Distribution Company generates $400 more net income than the order from the brewing company.

You may want to try some alternative changes in revenue, costs, or number of coolers to be purchased in the special order to see how each change affects the total cost.