



# **Application Manual for:**

  

# **‘Sensitivity Analyzer’**

© Owl Database Applications 2006  
305 Terrace Park, Red Deer, AB T4N 1V8  
Tel/Fax: (403) 309-1740; e-mail: [uhofer@owldb.com](mailto:uhofer@owldb.com)

<b>1</b>	<b>Purpose of Application .....</b>	<b>4</b>
1.1	Play the Numbers .....	4
1.2	Know your 'Annual Operating Plan' (AOP).....	4
1.3	Explore Alternatives.....	4
1.4	Find the 'Points of no Return' .....	4
1.5	A Word of Caution .....	4
<b>2</b>	<b>The Three Parts of the Application.....</b>	<b>6</b>
2.1	Product Mix.....	6
2.2	Scenario.....	6
2.3	Sensitivity Analysis .....	6
<b>3</b>	<b>Getting Ready .....</b>	<b>7</b>
3.1	Using the Product Mix Feature or Not? .....	7
3.2	Where to Start.....	7
<b>4</b>	<b>Populating the Product Mix.....</b>	<b>8</b>
4.1	Defining the Products .....	8
4.2	The Different Fields .....	9
4.2.1	Mix Name .....	9
4.2.2	Product Name .....	9
4.2.3	Units Sold.....	9
4.2.4	List Price .....	9
4.2.5	Concession .....	9
4.2.6	Commission .....	9
4.2.7	Shipping .....	9
4.2.8	Pass Through.....	10
4.2.9	Material .....	10
4.2.10	Direct Hours .....	10
4.2.11	Recalculation.....	10
4.3	Additional Features.....	10
4.3.1	Find Mix Name .....	10
4.3.2	Keep Constant .....	10
4.3.3	Transfer Mix to Existing Scenario .....	10
4.3.4	Transfer Mix to New Scenario.....	11
4.3.5	Import Existing Mix.....	11
4.3.6	Delete This Mix .....	11
4.3.7	Exported.....	11
<b>5</b>	<b>Scenarios .....</b>	<b>12</b>
5.1	General .....	12
5.2	The Different Fields and Buttons .....	12
5.2.1	Find Scenario .....	12
5.2.2	Scenario Description .....	13
5.2.3	* Number of Units Sold .....	13
5.2.4	* Description of Unit .....	13
5.2.5	* List Sale Price.....	13

5.2.6	* Concessions .....	13
5.2.7	* Commission .....	13
5.2.8	* Delivery, Shipping.....	13
5.2.9	* Pass Trough Costs .....	14
5.2.10	Other .....	14
5.2.11	* Material .....	14
5.2.12	* Labor Hours per Unit .....	14
5.2.13	Hour Rate (Variable Costs).....	14
5.2.14	Variable Labor Overhead.....	14
5.2.15	Fixed Labor Overhead .....	14
5.2.16	Other Cost of Sales.....	15
5.2.17	Sales and Marketing, Engineering and Administration .....	15
5.2.18	Other .....	15
5.2.19	Import Numbers from another Scenario.....	15
5.2.20	Variable Costs.....	15
<b>6</b>	<b>Analyze a Scenario.....</b>	<b>16</b>
<b>7</b>	<b>Compare Scenarios.....</b>	<b>17</b>

# **1 Purpose of Application**

## **1.1 Play the Numbers**

Establishing the Annual Operating Plan, Business Plan or Budget is normally a cumbersome process, the efforts required to establish it barely leaves time for developing alternatives. With the Sensitivity Analyzer, you can very easily play with the numbers and develop alternative Scenarios before you decide which case you want to base your Annual Operating Plan on.

## **1.2 Know your 'Annual Operating Plan' (AOP)**

For a successful manager it is essential to know the current 'Annual Operating Plan'. 'Knowing' not in the sense of being able to repeat its numbers out of your head, but rather to have the feeling for the items critical for success.

Every 'Annual Operating Plan' (AOP) has items where very small deviations of only a few percent decide over success or failure. Other items can be off by tens of percentage points without having a real impact on the bottom line.

The 'Sensitivity Analyzer' allows you to load your 'Annual Operating Plan' (AOP) and determine the sensitive items. These items are the ones you want to monitor carefully during the year so you can react early if they start moving in the wrong direction. On the other hand you don't waste your energies on AOP items that barely influence the outcome of the year.

## **1.3 Explore Alternatives**

When creating a new AOP, the 'Sensitivity Analyzer' allows to easily establish alternative scenarios; be it to move your sales effort from one product to another (because it is more profitable) or increasing some costs to save money somewhere else.

## **1.4 Find the 'Points of no Return'**

It is always good business practice to know, ahead of time, at what point you will start losing money. Explore these 'Points of no Return' with the 'Sensitivity Analyzer' and determine the probability of them to happen.

## **1.5 A Word of Caution**

The 'Sensitivity Analyzer' uses approximations and averages to calculate the different Scenarios. The resulting numbers might therefore slightly differ from the ones obtained with a detailed calculation. Even by loading your actual numbers you can not expect the result to precisely match the actual number.

The 'Sensitivity Analyzer' allows you to quickly calculate different scenarios. It is up to you, the user to determine if the underlying assumptions are realistic. Always keep in mind that reality doesn't care what you put in your plans.

Owl Database Applications, its organs and employees can therefore not be held liable for decisions made based on results of the 'Sensitivity Analyzer'

## **2 The Three Parts of the Application**

### **2.1 Product Mix**

Most companies deal with a wide spectrum of products. The mix of these products can have a considerable influence on a year's numbers. The Product Mix feature allows you to easily include changes in product mix in your Scenarios. The use of the Product Mix feature is not mandatory.

### **2.2 Scenario**

Based on your numbers, the Scenario form calculates your Annual Operating Income. This form is the heart of the application.

### **2.3 Sensitivity Analysis**

Slightly change the numbers of a Scenario and see what influence these changes have on the 'Bottom Line'

## 3 Getting Ready

### 3.1 Using the Product Mix Feature or Not?

If you want to use the Product Mix feature of the 'Sensitivity Analyzer' or not depends primarily on the product spectrum your business handles:

- If you deal with a spectrum that has big differences in price, costs or target markets (~ >1:2) it might be helpful later on to go through the extra effort
- On the other hand, if your products are similar regarding price, costs and target markets, the additional effort to populate the Product Mix with numbers might outweigh the benefits
- Using the Product Mix feature also depends on the available data, if they are detailed enough to populate the fields for the different products. It doesn't make much sense to base the product mix on (gu)estimates.

Even if you decide now not to use the Product Mix feature, you can always create Scenarios based on a Product Mix at a later time and vice versa

### 3.2 Where to Start

In planning it is always a good idea to use the immediate past as a springboard to forecast the near future. It is therefore advisable to start with the last business year you have actual numbers for. As an alternative, you could use the year to date figures of the current business year and extrapolate for the whole year.

## 4 Populating the Product Mix

The screenshot shows the 'Product Mix' form in Sensitivity Analyzer V 1.0. The form includes a search bar for 'Find Mix Name', a 'Print this Mix' button, and a 'Mix Name' field set to '2006 Widgets Actual'. There are also buttons for 'Exported', 'Transfer Mix to Existing Scenario', 'Import Existing Mix', 'Delete This Mix', and 'Transfer Mix to New Scenario'. The 'Keep Constant' section has radio buttons for 'None', 'Hours', and 'Sales \$', with 'Sales \$' selected.

Product Name	Units Sold	List Price	Concession	per unit Values					Total Per Product	
				Commission	Shipping	Pass Through	Material	Direct Hours	Sales	Hours
Prod 1 Widget A	203	30.00	0.00%	2.00%	0.00	0.00	3.00	0.6	6,090	122
Prod 2 Widget B	298	20.00	0.00%	2.00%	0.00	0.00	2.00	0.4	5,960	119
Prod 3 Widget C	3,647	100.00	0.00%	2.00%	0.00	0.00	10.00	3.0	364,700	10,941
Prod 4 Widget D	1,834	200.00	0.00%	2.00%	0.00	0.00	20.00	6.0	366,800	11,004
Prod 5	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
Prod 6	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
Prod 7	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
Prod 8	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
Prod 9	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
Prod 10	0	0.00	0.00%	0.00%	0.00	0.00	0.00	0.0	0	0
<b>Total Product Mix</b>	<b>5,982</b>	<b>124.30</b>	<b>0.00%</b>	<b>2.00%</b>	<b>0.00</b>	<b>0.00</b>	<b>12.43</b>	<b>3.7</b>	<b>743,550</b>	<b>22,186</b>

### 4.1 Defining the Products

The 'Sensitivity Analyzer' accommodates up to 10 products or product groups. Before collecting the data define the different Products / Product Groups taking the following criteria into consideration:

- Technical similarities
- Similar price and cost structure
- Market specific products
- Number of units sold

Once you have the products / product groups defined, you can start collecting data and populate the different fields.

## **4.2 The Different Fields**

### **4.2.1 Mix Name**

Enter a Mix Name. When looking for an existing mix, the Mix Names appear sorted in ascending order. It might therefore be a good idea to start the Mix Name with the year (e.g. 2006 Actual, 2007 Plan, etc.)

### **4.2.2 Product Name**

Give each Product / Product Group a distinct name so you can differentiate them later on

### **4.2.3 Units Sold**

This is straight forward the number of units sold per product / product group

### **4.2.4 List Price**

Especially if you are working with product groups, it is recommendable to use the List Price in this field and not the actual Sale Price. This allows you to track price increases / decreases as well as mix changes within a specific product group from year to year

### **4.2.5 Concession**

If your Sale Price is not the same as your List Price enter the difference here as a percentage of the List Price. A positive percentage means that the Sale Price is lower than the List Price.

### **4.2.6 Commission**

This field contains the Commission(s) in percent of the List Price. In case your business bases the Commission on the Sale Price you have to convert it.

### **4.2.7 Shipping**

Only enter the average Shipping Costs per unit here if the costs of Shipping and Delivery are included in your List Price. Otherwise leave at 0.00

#### **4.2.8 Pass Through**

This column contains the Pass Through Costs included in your List Price. Pass Throughs are items you purchase and pass on to the customer without mark-up (and therefore not part of 'Value Added').

#### **4.2.9 Material**

Enter the average Material Costs per unit and Product / Product Group into these fields

#### **4.2.10 Direct Hours**

If your business tracks labor hours that are charged to a product (e.g. manufacturing, etc.), enter them here (in hours per Unit and Product / Product Group); if not, leave at 0.0.

#### **4.2.11 Recalculation**

Every time a new value is entered into one of above fields, the whole form is automatically recalculated. Note:

- The fields in the 'Total Product Mix' row and the 'Total per Product' columns can NOT be edited. The 'Total Sales' is 'List Price' times 'Units Sold' regardless of a 'Concession'

### **4.3 Additional Features**

#### **4.3.1 Find Mix Name**

After selecting a mix from the drop down box, the form focuses on the selected mix.

#### **4.3.2 Keep Constant**

When developing alternate Scenarios for a year, you might want to keep the total Hours or Sales (again, 'List Price' times 'Units Sold') constant. Click on the appropriate button and a field for entering the respective value will appear. As long as the Total Sales / Total Hours value is within  $\pm 5\%$  of the Value entered, the field will be solid green, if the total is below the 'Constant' value, it will blink orange, if above, red.

#### **4.3.3 Transfer Mix to Existing Scenario**

Click on this button to export the Product Mix to a Scenario you have already set up. A new form will pop up where you have to select the Scenario you want the Product Mix to export to. Click Transfer and the values of the 'Total Product Mix' row will be transferred to the selected Scenario.

Note:

- If the Scenario you export to already contains data from another Product Mix, they will be overwritten.
- Once a Product Mix is used in a Scenario, the Product Mix can neither be edited nor deleted (for data integrity reasons). It can still be exported to other Scenarios though.

#### **4.3.4 Transfer Mix to New Scenario**

Click on this button to export the Product Mix to a new Scenario. A new form will pop up where you have to enter the name for the Scenario you want to create. Click Transfer and the values of the 'Total Product Mix' row will be transferred to the new Scenario.

Note:

- Once a Product Mix is used in a Scenario, the Product Mix can neither be edited nor deleted (for data integrity reasons). It can still be exported to other Scenarios though.

#### **4.3.5 Import Existing Mix**

Click on this button to import an existing Product Mix to this Product Mix. A new form will pop up where you have to select the name of the Product Mix you want to import. Click Transfer and all the values will be transferred

#### **4.3.6 Delete This Mix**

If you don't need a Product Mix any longer, you can delete it by simply clicking on this button.

Note:

- The 'Delete' button is not available as long as the Product Mix is used in one of the Scenarios.

#### **4.3.7 Exported**

If a Product Mix is used in a Scenario, this box is checked off. At the same time, the top part of the form changes its color to green.

Remember that a Product Mix that is included in a Scenario can not be modified or deleted. If you have to change the Product Mix used in a Scenario, create a new Product Mix and export it to the Scenario in question. Once overwritten in the Scenario, you can delete the Product Mix.

# 5 Scenarios

## 5.1 General

The Scenario form has green and white fields. The green fields are the ones that accept / require input, the white ones are calculated based on the input and can not be edited.

If the legend of a field starts with '\* ', its values are imported from an underlying Product Mix. In a Scenario that is based on a Product Mix (the '\* Description of Unit' field starts with 'Product Mix:') '\* ' marked field can not be edited.

## 5.2 The Different Fields and Buttons

The screenshot shows the 'Scenarios' form in Sensitivity Analyzer V 1.0. The scenario is '2006 Actual'. The form is divided into several sections: Input fields, Summary, Variable Costs, and Operating Expenses. Green fields indicate input fields, while white fields indicate calculated values.

* Number of Units Sold		5,982	* Description of Unit: Product Mix: 2006 Widgets Actual	
	per Unit	%	Total	
* List Sale Price	124.30			
<b>Gross Sales</b>			<b>743,550</b>	
* Concessions		0.00%	0	
* Commission		2.00%	14,871	
* Delivery, Shipping	0.00		0	
* Pass Through Cost	0.00		0	
Other			0	
<b>Sales Adjusted</b>			<b>728,679</b>	in % Gross Sales 98.0%
* Material	12.43		74,355	in % Sales Adjusted 10.2%
* Labor Hours per Unit	3.71			
Hour Rate (Variable Cost)	20.00			
Variable Labor Cost			74.18	443,720 in % Sales Adjusted 60.9%
Variable Labor Overhead		15.0%		66,558 Total Labor Overhead in % Sales Adjusted 11.9%
Fixed Labor Overhead				20,000
Other Cost Of Sales (Variable)	0.00			0
Other Cost Of Sales (Fixed)				0
Total Cost Of Sales				604,633
<b>Gross Margin</b>			<b>124,046</b>	in % Sales Adjusted 17.0%
Sales & Marketing				30,000
Engineering				30,000
Administration				30,000
Other				0
Total Operating Expenses				90,000
<b>Operating Income</b>				<b>34,046</b>

  

Product Name	Var. Cost	% List
Widget A	17.40	58.0%
Widget B	11.60	58.0%
Widget C	81.00	81.0%
Widget D	162.00	81.0%
	0.00	0.0%
	0.00	0.0%
	0.00	0.0%
	0.00	0.0%
	0.00	0.0%
Average	100.22	80.6%

### 5.2.1 Find Scenario

Used to select the Scenario to be displayed. In the drop-down list the scenarios appear in ascending order of the scenario description.

## **5.2.2 Scenario Description**

When naming a new Scenario it might be good practice to start the description with the year the Scenario applies to (e.g. 2006 Actual, 2007 Base Scenario, etc). That way all Scenarios for a specific year appear grouped together when using the Find Scenario drop down box.

## **5.2.3 \* Number of Units Sold**

This field is self-explanatory; it needs input only if the Scenario will not be based on an imported Product Mix.

## **5.2.4 \* Description of Unit**

This field is self-explanatory; it needs input only if the Scenario will not be based on an imported Product Mix.

## **5.2.5 \* List Sale Price**

It is recommendable to use the List Price in this field and not the actual Sale Price. This allows you to track price increases / decreases from year to year. If the information is available, enter the difference between List Price and actual sales price as Concession. This field needs input only if the Scenario will not be based on an imported Product Mix.

## **5.2.6 \* Concessions**

If your Sale Price is not the same as your List Price enter the difference here as a percentage of the List Price. A positive percentage means that the Sale Price is lower than the List Price. The field in the 'Total' column will display the total amount of Concessions. This field needs input only if the Scenario will not be based on an imported Product Mix.

## **5.2.7 \* Commission**

This field contains the Commission(s) in percent of the List Price. In case your business bases the Commission on the Sale Price you have to convert it. This field needs input only if the Scenario will not be based on an imported Product Mix.

## **5.2.8 \* Delivery, Shipping**

Only enter the average Shipping Costs per unit here if the costs of Shipping and Delivery are included in your List Price. Otherwise leave at 0.00. This field needs input only if the Scenario will not be based on an imported Product Mix.

### **5.2.9 \* Pass Trough Costs**

This column contains the Pass Through Costs included in your List Price. Pass Throughs are items you purchase and pass on to the customer without mark-up (and therefore not part of 'Value Added'). This field needs input only if the Scenario will not be based on an imported Product Mix.

### **5.2.10 Other**

If you have fixed pass through costs that are not part of your value added, enter them here as a lump sum for the year.

### **5.2.11 \* Material**

Enter the average Material Costs per unit into this field. It needs input only if the Scenario will not be based on an imported Product Mix.

### **5.2.12 \* Labor Hours per Unit**

If your business tracks labor hours that are charged to a product (e.g. manufacturing, etc.), enter them here (in hours per Unit); if not, leave at 0.0. This field needs input only if the Scenario will not be based on an imported Product Mix.

### **5.2.13 Hour Rate (Variable Costs)**

Enter your straight average hourly rate (for the 'Labor Hours') in this field.

### **5.2.14 Variable Labor Overhead**

For every \$ you pay to your hourly employees, there is a certain amount of variable overhead directly related to the paid-out wages (holidays, housekeeping, benefits, etc). Enter it as a percentage of the average hourly rate.

### **5.2.15 Fixed Labor Overhead**

This field is for overhead costs that do not change with paid out wages (of course within certain limits), e.g. supervisor salaries, energy cost, deferred square footage costs, etc. Enter them here as a lump sum for the whole year.

### **5.2.16 Other Cost of Sales**

If you incur cost of sales that are not covered with above fields enter them here, either on a per unit base and/or as a fixed amount for the whole year.

### **5.2.17 Sales and Marketing, Engineering and Administration**

Enter the costs for these activities here.

### **5.2.18 Other**

Enter all other Operating Expenses not covered with one of the other 3 fields here as a fixed amount per year.

### **5.2.19 Import Numbers from another Scenario**

By clicking on this button, you can create a copy of another Scenario. If the Scenario is already based on a Product Mix, the '\* ...' fields are not overwritten.

### **5.2.20 Variable Costs**

If the Scenario is based on a Product Mix, the form displays the Variable Costs and the Variable Costs as a Percentage of the List Sale Price for each Product / Product Group

## 6 Analyze a Scenario

Sensitivity Analyzer					
Find Scenario	2006 Actual		Changes		
Sold Units	5,982		0.0%	5,982	
Sale Price	124.30		0.0%	124.30	
<b>Gross Sales</b>	<b>743,550</b>			<b>743,550</b>	
Concessions	0		0.0%	0	
Commissions	14,871		0.0%	14,871	
Shipping	0		0.0%	0	
Pass Throughs	0		0.0%	0	
Other	0		0.0%	0	
<b>Sales Adjusted</b>	<b>728,679</b>			<b>728,679</b>	
Material	74,355		7.0%	79,560	
Labor Hours per Unit	3.71	22,186	0.0%	3.71	22,186
Hour Rate (Variable Costs)	20.00		0.0%	20.00	
Variable Labor Cost	443,720			443,720	
Variable Labor Overhead	66,558		0.0%	66,558	
Fixed Labor Overhead	20,000		0.0%	20,000	
Other Cost Of Sales (Variable)	0		0.0%	0	
Other Cost Of Sales (Fixed)	0		0.0%	0	
<b>Gross Margin</b>	<b>124,046</b>			<b>118,841</b>	
Sales & Marketing	30,000		0.0%	30,000	
Engineering	30,000		0.0%	30,000	
Administration	30,000		0.0%	30,000	
Other	0		0.0%	0	
<b>Operating Income</b>	<b>34,046</b>			<b>28,841</b>	

**Comparison Operating Income**

Scenario	Operating Income
Base	34,046
New	28,841

**(New - Base) in % Base**

Category	Value
Difference	-15.3%

This part of the application allows you to make a Sensitivity Analysis of each Scenario loaded without changing the original values.

Select the Scenario to be analyzed with the Find Scenario drop down box. The original values are displayed on the left hand side of the form.

With the up/down buttons in the middle of the form you can enter the percentage by which you want to change the original value in 1.0 % steps. You can change any number of values. The changed numbers are recalculated with each click and displayed on the middle right hand side of the form.

The top graph on the far right hand side of the form compares the original Operating Income and the new Operating income in absolute values, the bottom graph shows the difference between the two in % of the original Scenario.

If you want to keep an Analysis, just click the 'Print this Analysis' button. The created report is basically a copy of the form.

When closing the form or when moving to another Scenario, the last Change values are saved and again available when returning to this Scenario.

To reset all the changes just click the 'Reset Changes' button

## **7 Compare Scenarios**

The application comes with the possibility to compare up to four Scenarios in a single report. The first page shows the detailed numbers for the four, followed by a graph on the second page, comparing the Operating Incomes of each of the selected Scenarios.