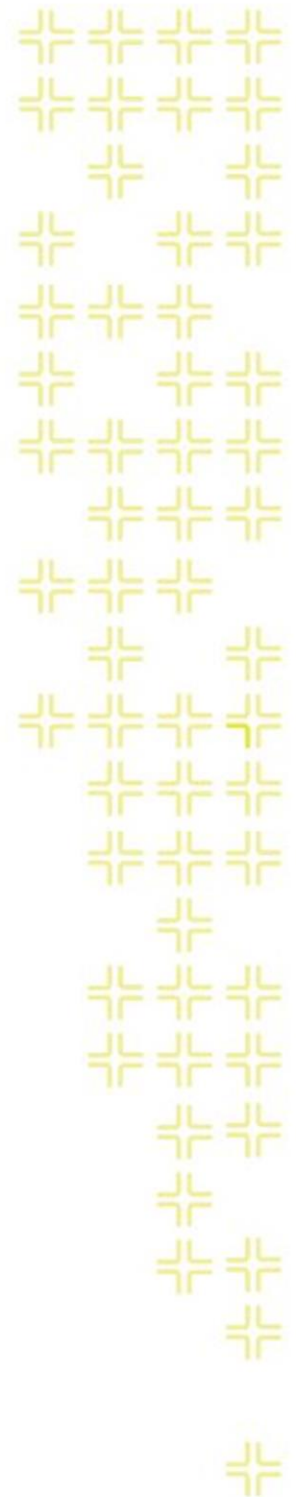




TRAINING GUIDE

# Advanced Crystal 1



# Using Crystal Reports with Lucity

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## Advanced - 1

The fifth of a seven-part series, this workbook is designed for Crystal Reports® users with some experience, who wish to explore the power of adding graphics to their reports.

Graphs help you visualize data. They show patterns and trends at-a-glance. In addition, they add impact to your ideas.

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## Developing a Graphical Report

Crystal Reports allows you to add graphs in the Report or Group Header and Footer sections of a report. In the following step-by-step example, we'll create a report showing the Sewer Work Orders grouped by categories. We'll add a bar graph showing number of Work Orders for each Sewer category and a pie chart to show percentage of Work Orders for each category.


1. We will modify the Work Order Category Summary Report (**WOCatSum.rpt**) from the Work Order module. From the Work report folder open **LC\_WOCatGraph.rpt**.
2. Change the Title to “**Sewer Work Orders by Category Report.**”
3. Next, we will limit the work orders to those for Sewer assets.
  - a. Open *Select Expert*.
  - b. Open the **WKORDER** table.
  - c. Highlight **WO\_INV\_ID** and click *OK*.
  - d. Select “is between” from the drop down box and type in 2 and 6 (2:Structure, 3:Pump Station, 4:Pump, 5:Service Lateral, 6:Pipe).
  - e. Then, click *OK*.
    - These numbers come from the **WKCATINV** table.
  - f. The *Select Expert* formula now looks like this:  
{WKORDER.WO\_INV\_ID} in 2 to 6

### Preview

<b>Sewer Work Orders By Category Report</b>			7/2/2014
			9:28 AM
Category		Count of WO's	* Total Cost
21100	Sewer Manhole	3	\$0.00
21200	Sewer Pipe	5	\$580.27

4. Use the *Insert Section Below* option to add an additional *Report Footer* section.
5. Increase the new section (*Report Footer b*) size to about 3 inches to make room for the graph.

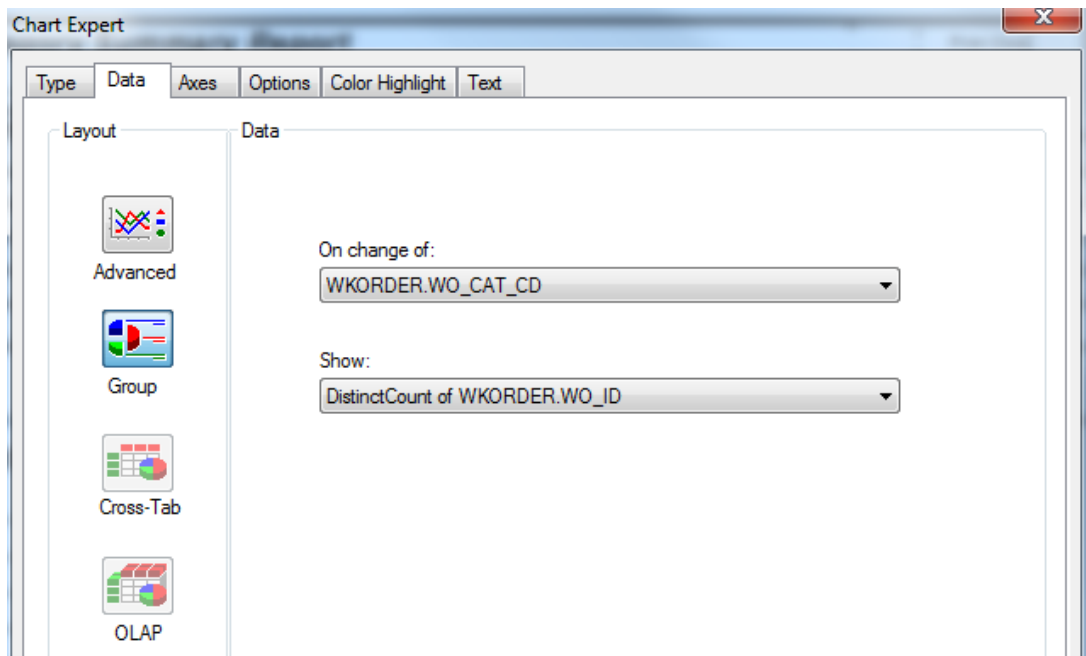
## Inserting a Graph

1. Click Insert Chart .
2. Place the “box” where the graph is to be located in the **Report Footer b** section.
3. The *Chart Expert* may automatically open, where you will proceed with the Data tab.

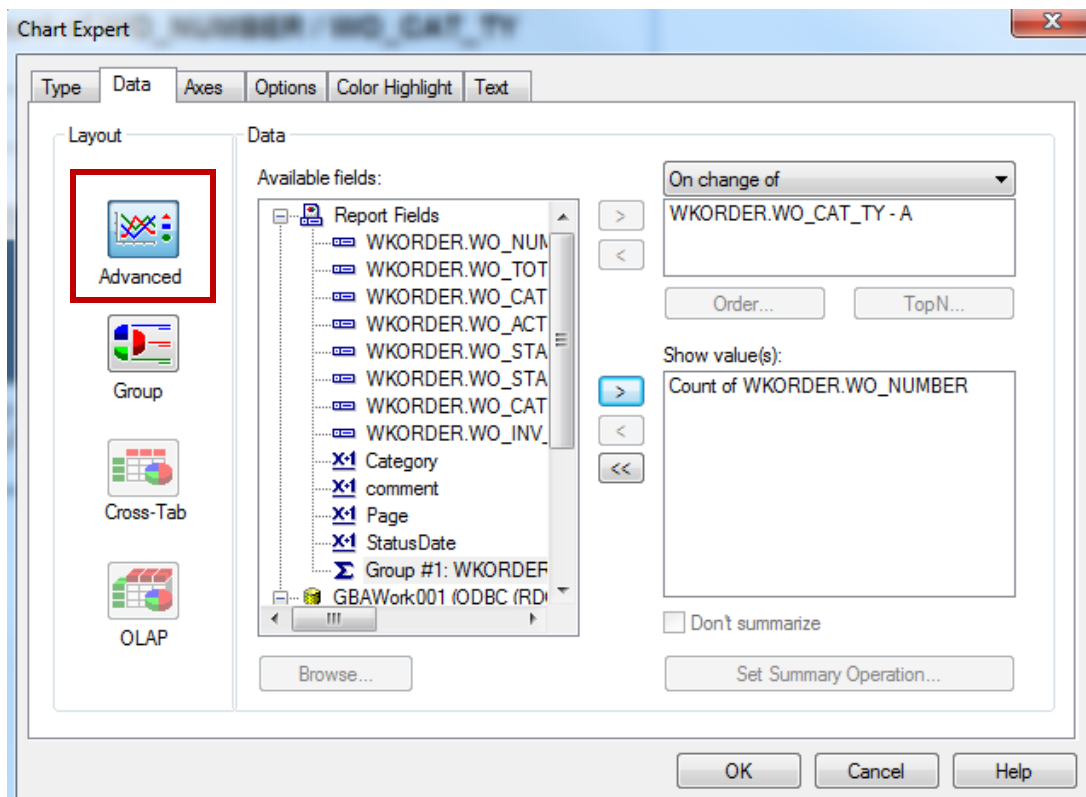
OR - Crystal may guess what data and type of graph you wish to use and drop the graph in. If the graph shows up then you will need to right click in the graph box and select *Chart Expert* to make any revisions.

## Chart Expert, Data tab

If Crystal has guessed on your data, the following should appear:

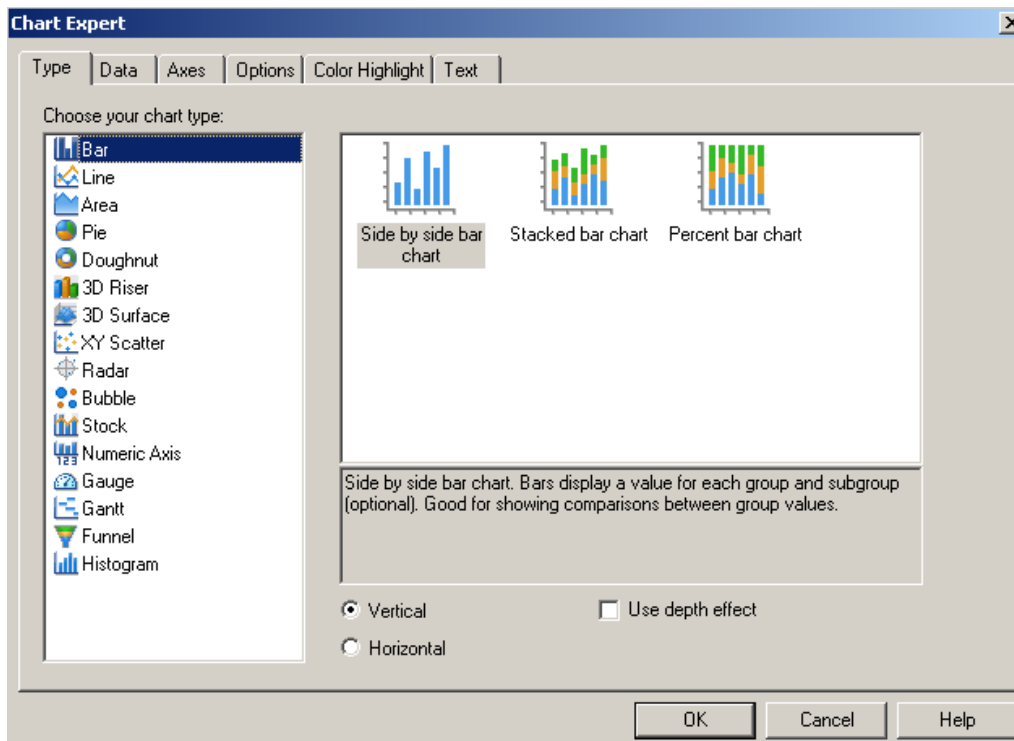


4. If this is correct, then you should look at the options within the other tabs to modify as needed. If this isn't correct, then click on **Advanced** and set up the data as follows:

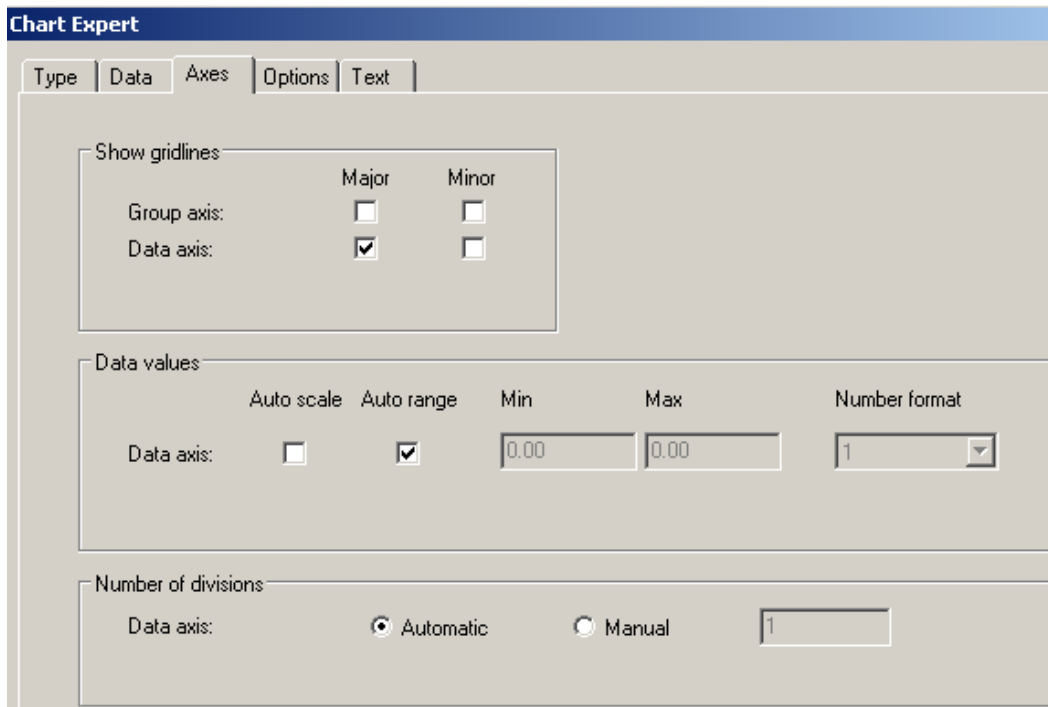


## Chart Expert, Type Tab

Highlight the “Side by side bar chart” option.



## Chart Expert, Axes tab



## Chart Expert, Options tab

The screenshot shows the 'Chart Expert' dialog box with the 'Options' tab selected. The dialog is divided into several sections:

- Chart color:** Radio buttons for 'Color' (selected) and 'Black and white'. A 'Format' button is to the right.
- Data points:** Checkboxes for 'Show label' and 'Show value', both unchecked. A 'Number format' dropdown menu is set to '1'.
- Customize settings:** A 'Transparent background' checkbox is unchecked. 'Marker size' is set to 'Medium' and 'Marker shape' is set to 'Rectangle'. 'Bar size' is set to 'Large'.
- Legend:** A 'Show legend' checkbox is checked. 'Placement' is set to 'Right'.

## Chart Expert, Text tab

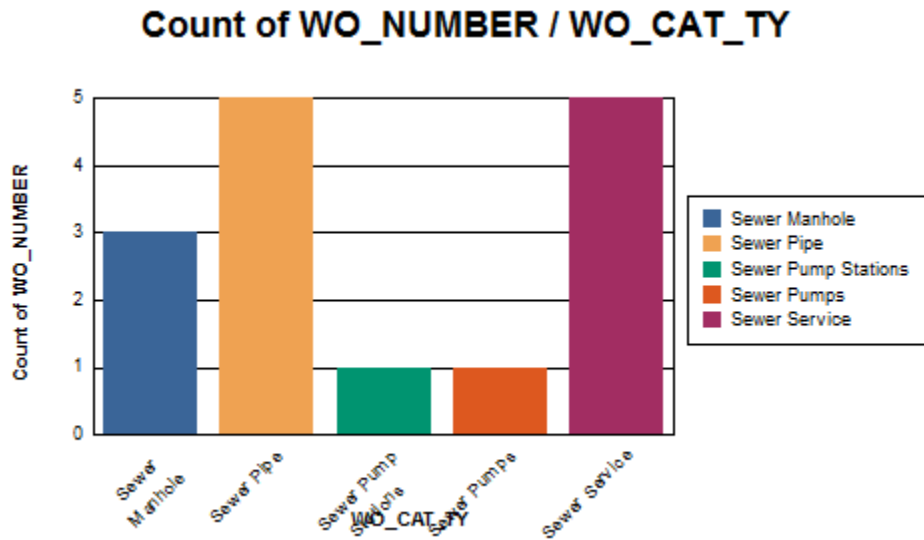
The screenshot shows the 'Chart Expert' dialog box with the 'Text' tab selected. The dialog is divided into two main sections:

- Titles:** A table for configuring auto-text for various chart elements. All checkboxes are checked.

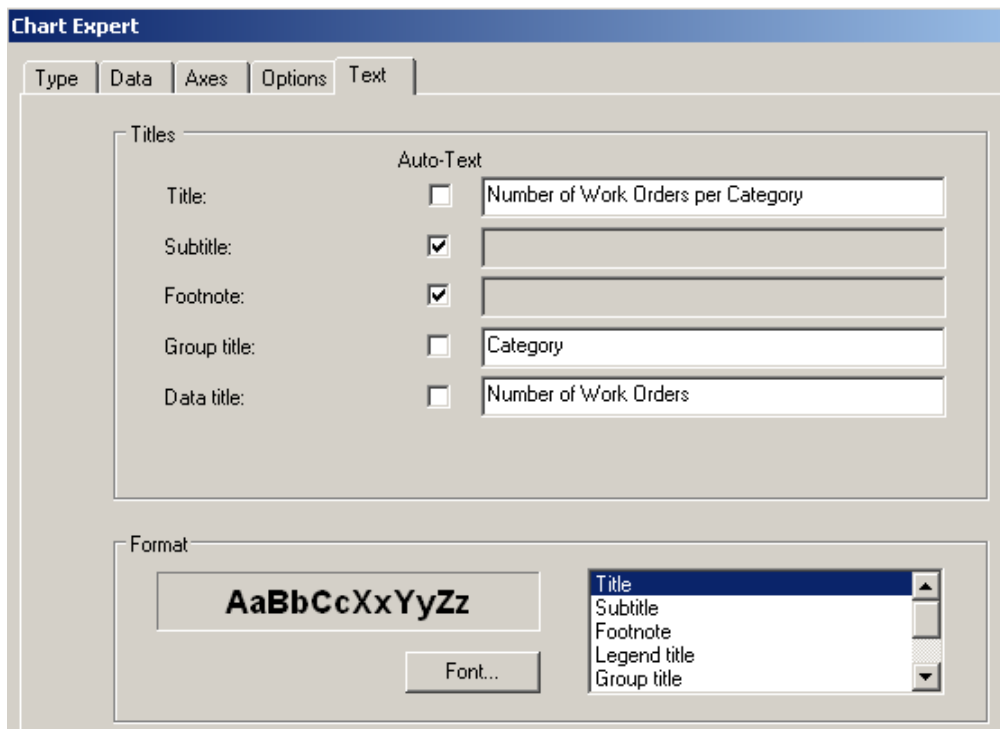
	Auto-Text
Title:	Count of WO_NUMBER / WO_CAT_TY
Subtitle:	
Footnote:	
Group title:	WO_CAT_TY
Data title:	Count of WO_NUMBER

- Format:** A preview box shows the text 'AaBbCcXxYyZz'. A 'Font...' button is below it. To the right is a list box containing: Title, Subtitle, Footnote, Legend title, and Group title.

The graph should look similar to the following with the current titles:

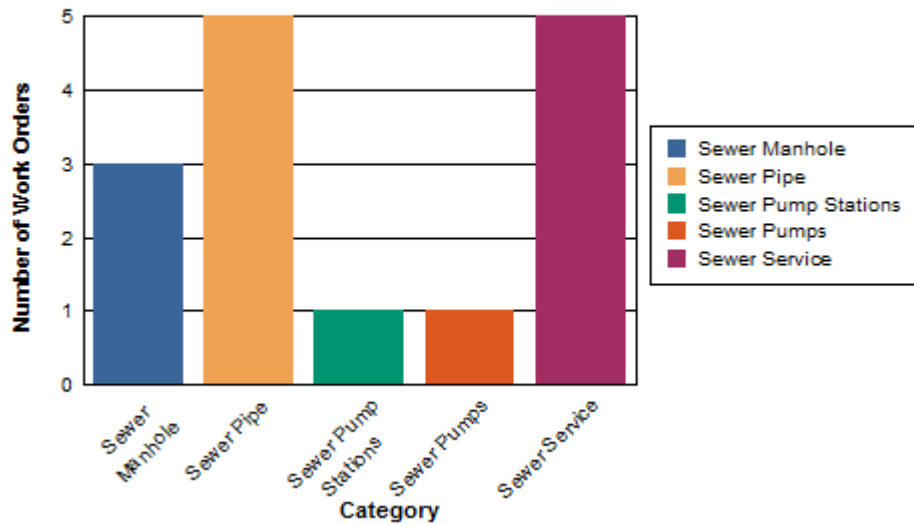


5. To modify the report, right click on the graph and select *Chart Expert*.
6. Change the names in the **Text** tab to clarify the graph titles.
  - o Uncheck the Auto-Text boxes to allow modification of the text in the associated field.



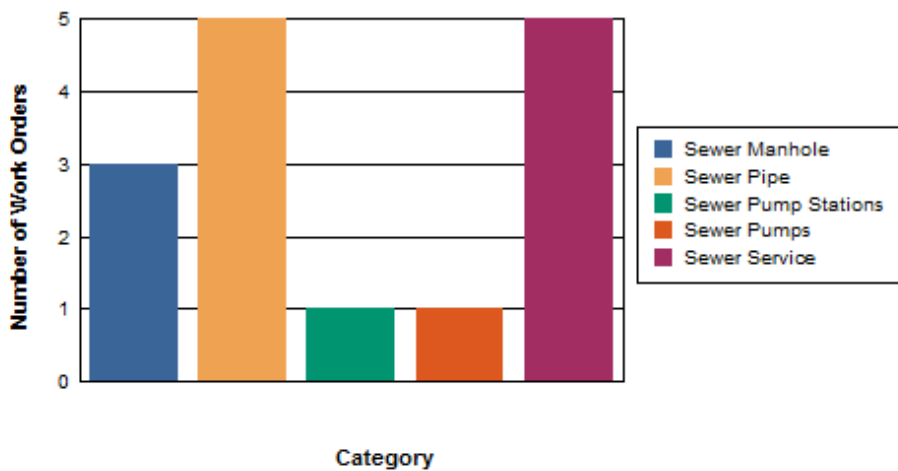
7. There may be an issue with overlapping of the Group axis title and the axis labels. One option to correct this is simply to move the Group axis title (Category).
  - a. Click on the axis title (Category) which activates black dots around the edges.
  - b. Click and drag the title to the new location.

## Number of Work Orders per Category



8. Another option would be to remove the axis values and let the legend suffice.
  - a. Click on one of the Group axis labels (such as Sewer Pipe) until it has the dotted box around it. (It may take multiple clicks)
  - b. Right click within this box and select *Format Axis Label...*
  - c. Under Color select “Transparent” and then *OK*.
  - d. Now the Legend will explain the categories.

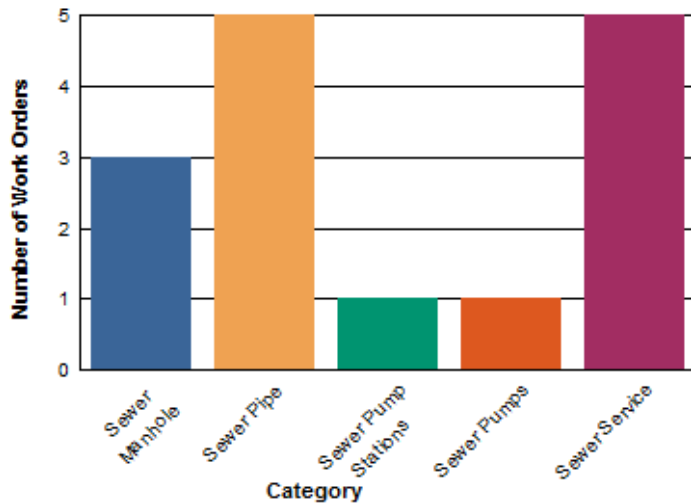
## Number of Work Orders per Category





9. If the graph works better with Group Axis values, then the legend is redundant information and could be removed. (Of course the Group Axis Label color would need to go back to black.)
  - o To remove the Legend open the *Chart Expert - Options tab*.
  - o Uncheck the “Show legend” box. Then *OK*.

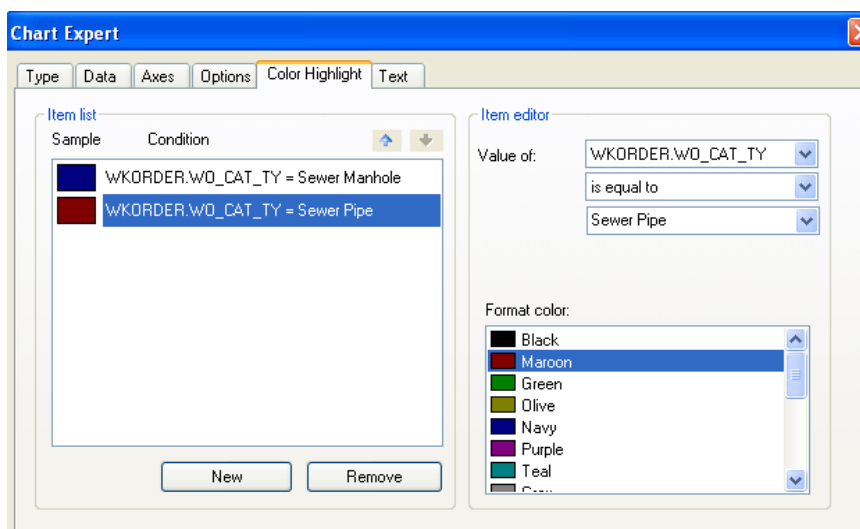
## Number of Work Orders per Category



## Chart Expert, Color Highlight

Sometimes it is helpful to use specific colors for certain groups. These can be set up in the Color Highlight tab using the drop down boxes to select the values.

- a. Click *New*
- b. Select the values and color in the *Item editor* section.
- c. Repeat *New* and *Values* for each Category that needs a specific color.
- d. Select *OK*.



Sewer Work Orders By Category Report			Print Date
Report Subtitle			Print Time
Category	Count of WO's	Total Cost	
GH1			
GH2a			
GH2b			
D			
GF2a			
GF2b			
GF1			
RFa			
Grand Totals:			@Total
RFb			

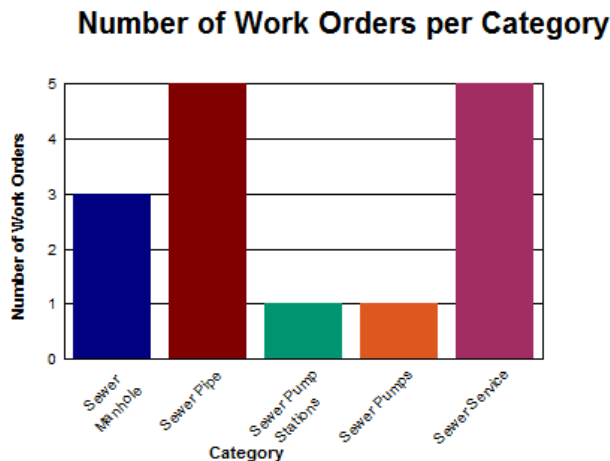
  

### Number of Work Orders per Category

Category	Number of Work Orders
2000	100
2001	200
2002	290

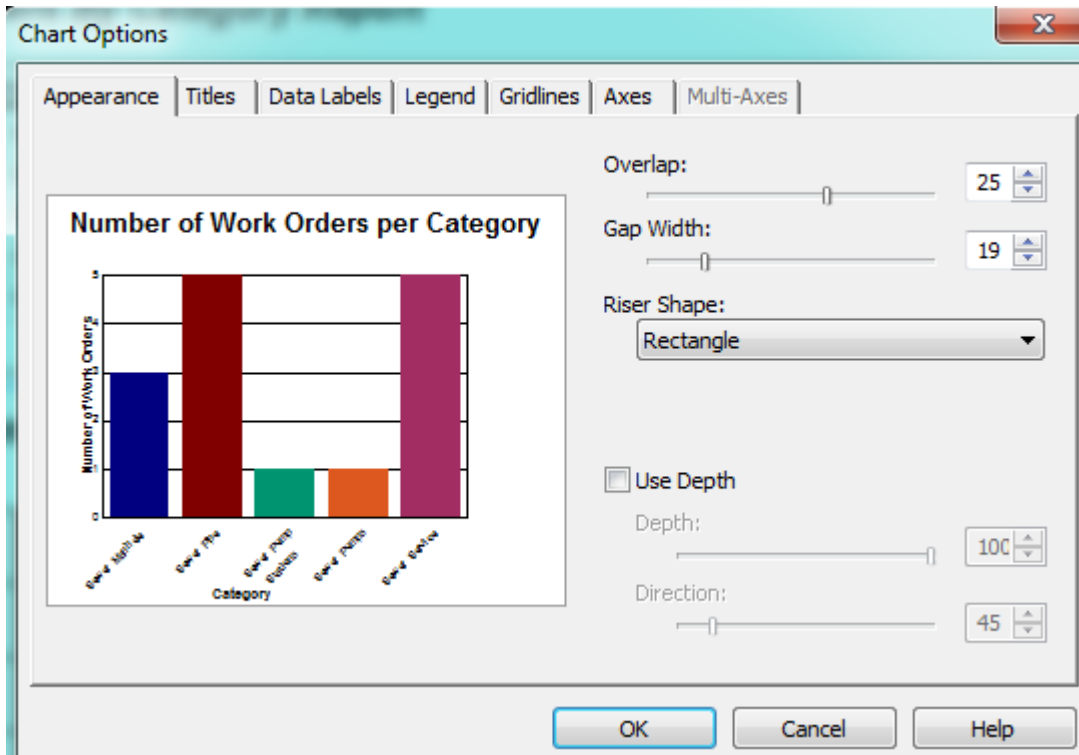
Preview

Sewer Work Orders By Category Report			7/2/2014
			11:29 AM
Category	Count of WO's	* Total Cost	
21100 Sewer Manhole	3	\$0.00	
21200 Sewer Pipe	5	\$580.27	
21300 Sewer Service	5	\$481.54	
22000 Sewer Pump Stations	1	\$0.00	
22100 Sewer Pumps	1	\$0.00	
Grand Totals:		15	\$1,061.81

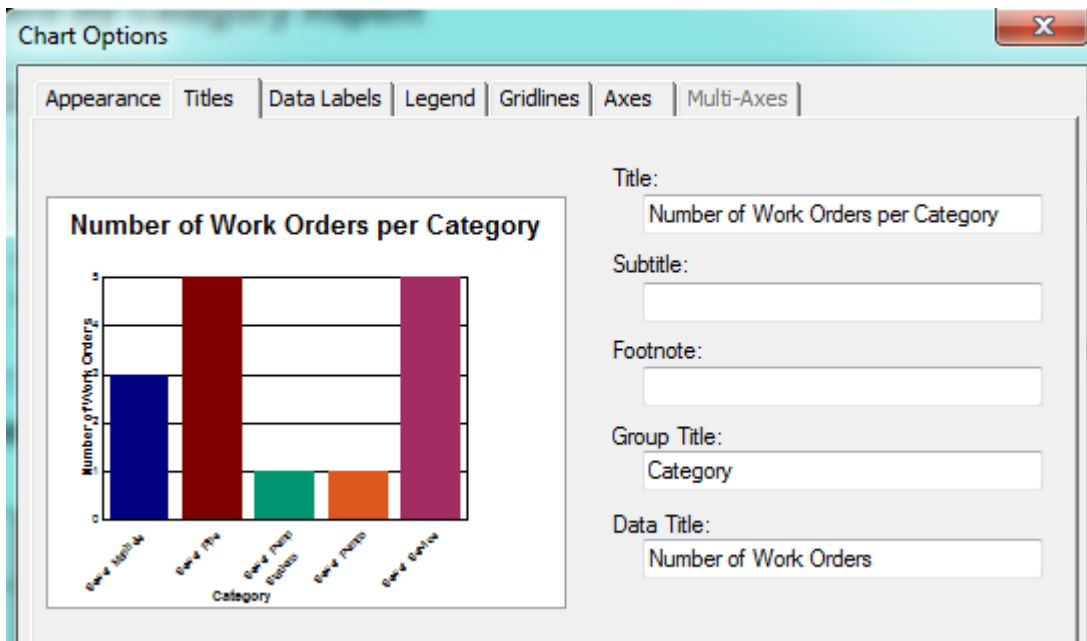


- Right click on the chart for further options. Examples of these options are displayed on the following pages. Options vary depending on the type of graph you are working with:

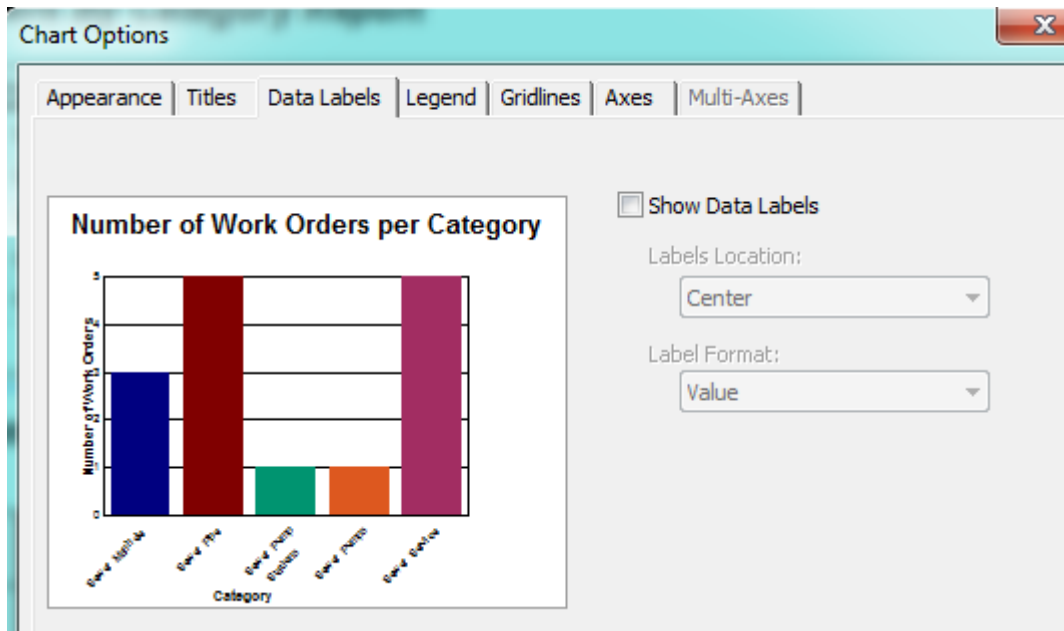
### Chart Options, Appearance tab



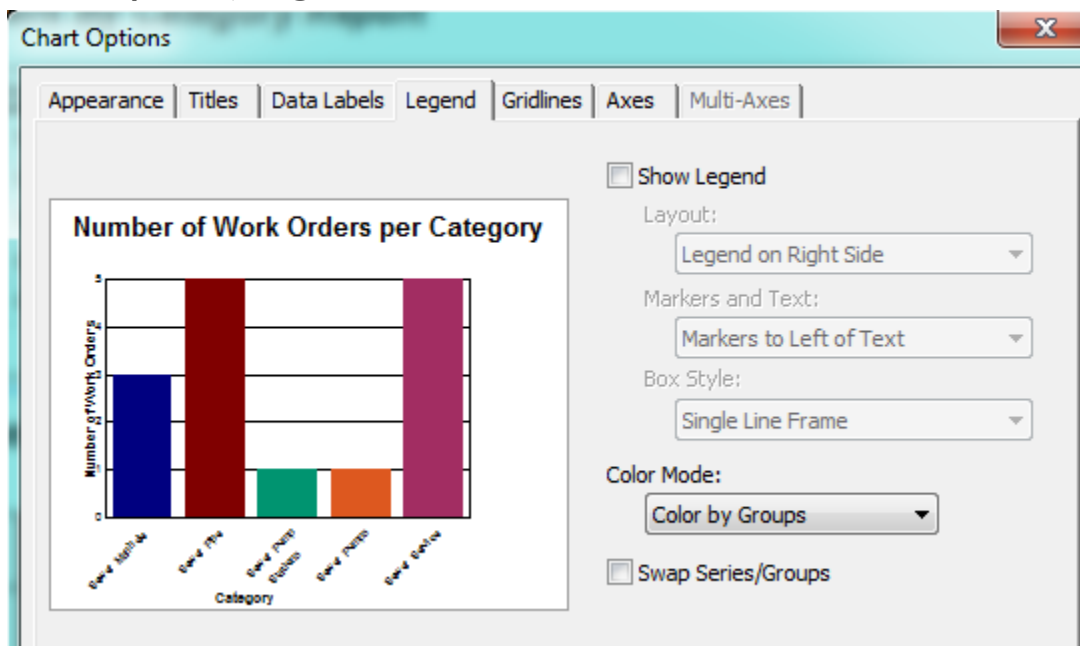
### Chart Options, Titles tab



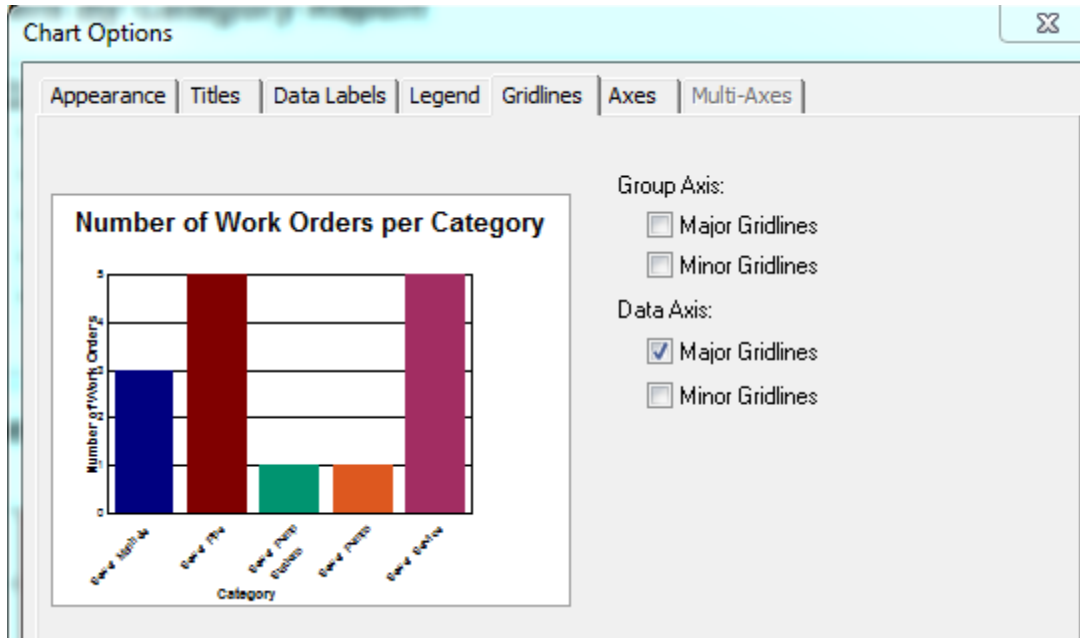
## Chart Options, Data Labels tab



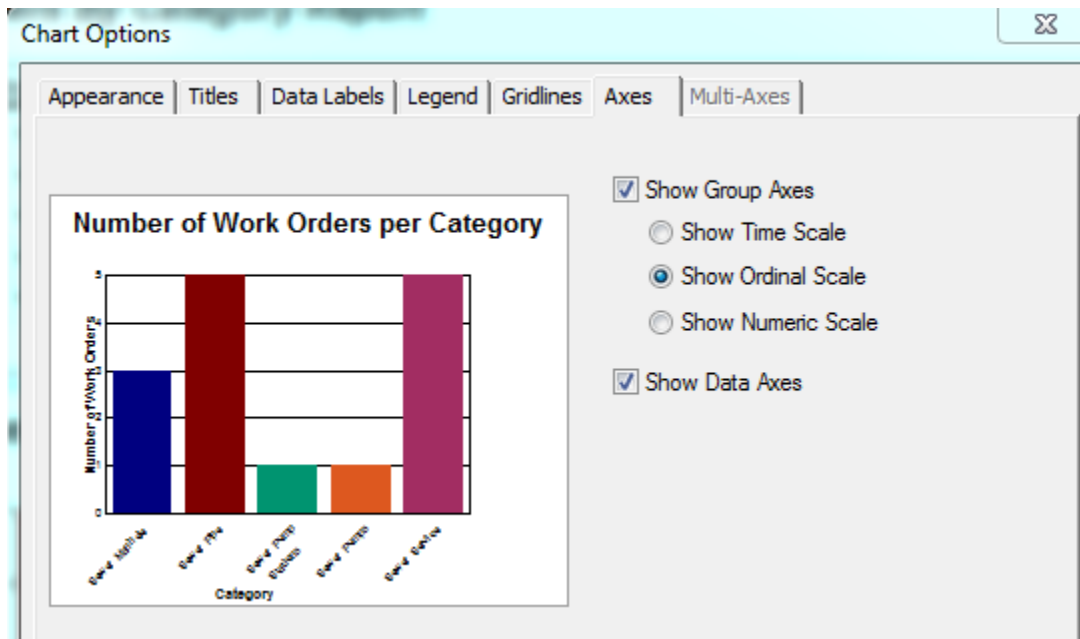
## Chart Options, Legend tab



## Chart Option, Gridlines tab



## Chart Options, Axes tab



- You can play with the options until you achieve the look that best portrays your information.

Example 22A

## Chart Type

In the *Chart Expert*, *Type* tab, you can select the Chart Type. These include **Bar**, **Pie**, **Line**, **Gauge**, etc.

### Pie Chart

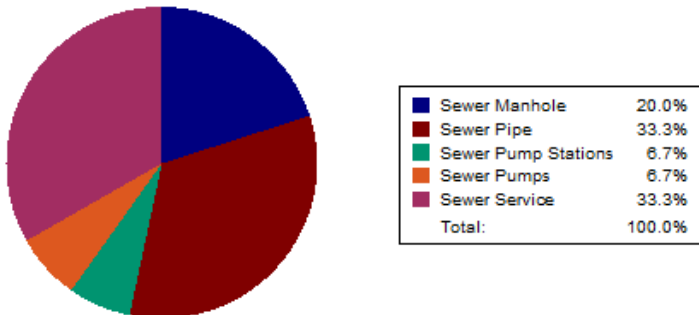
If the Pie option had been chosen instead of the Bar Graph pictured above, the graph we created would look like this:

#### Number of Work Orders per Category



The Legend needs to be added back in. (*Options* tab)

#### Number of Work Orders per Category



The Categories are shown as percentages so the title should reflect this. (*Text* tab)

#### Percentage of Work Orders per Category

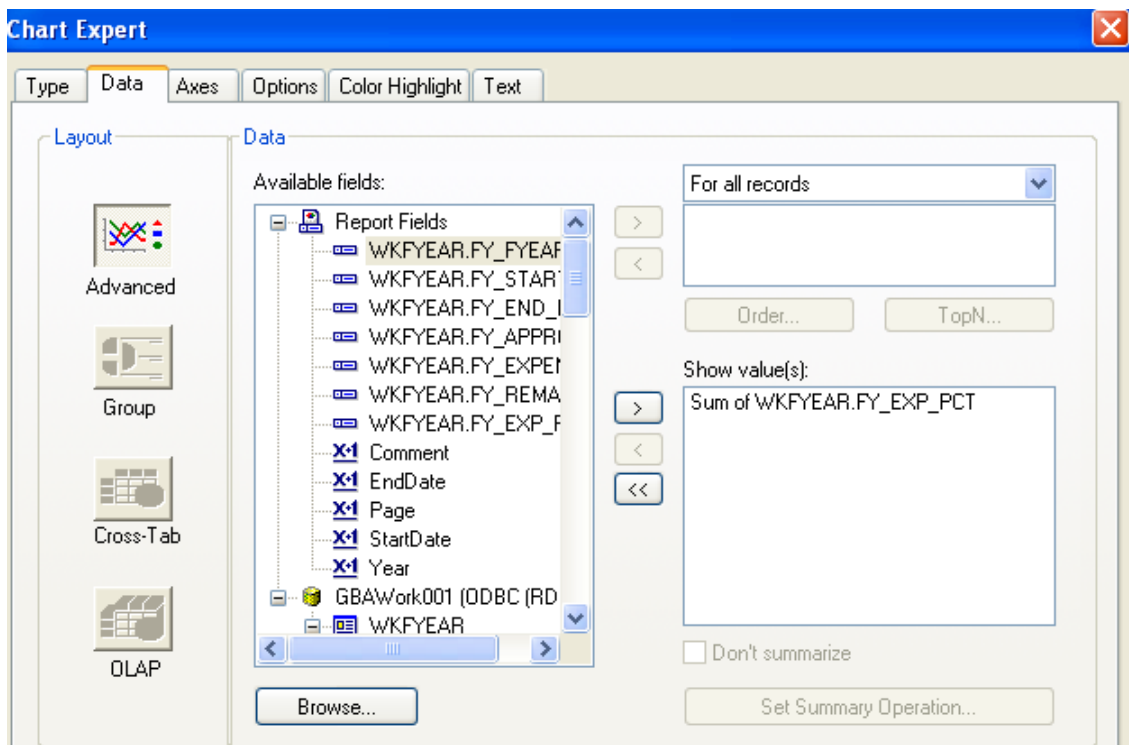
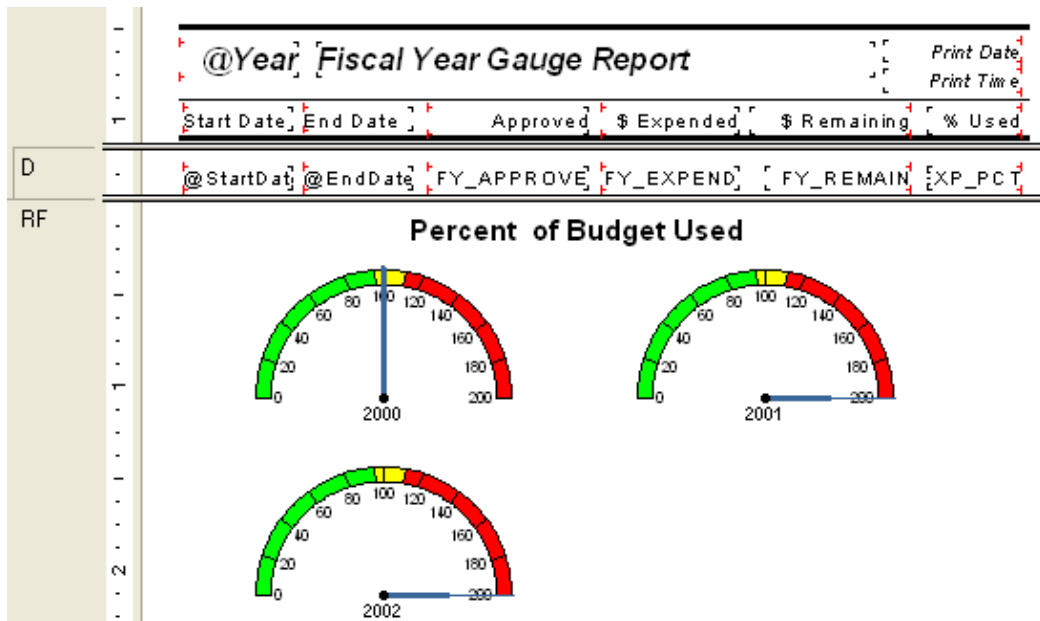


Example 23A and Example 24A

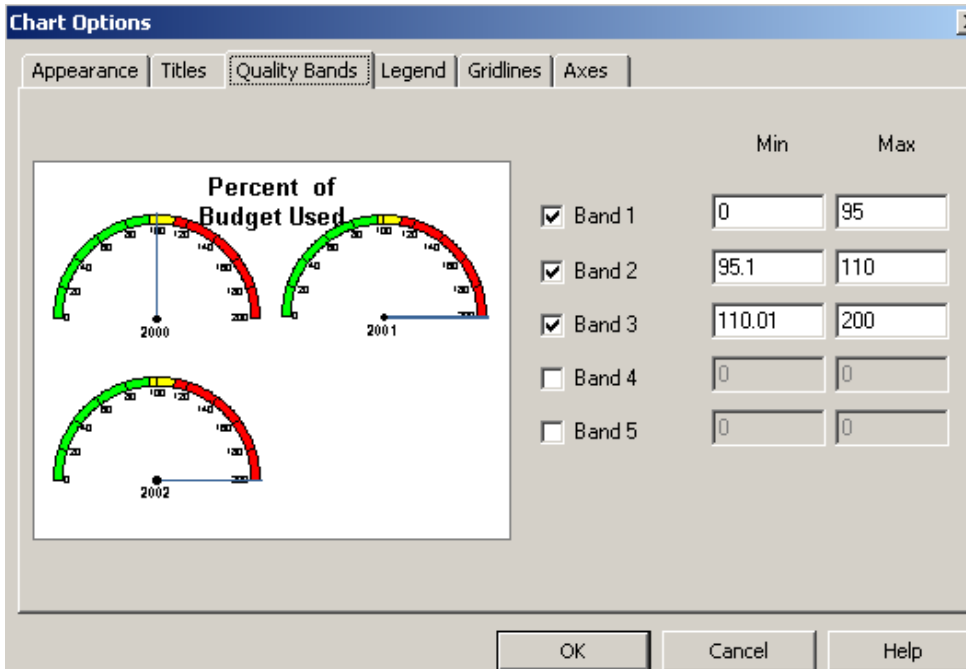
## Gauge Chart

Gauge reports give a unique perspective on data. An expenditure report can show where you are with your spending for the year. You can set the values and colors of your bands. At a glance the pointer will show you where you are now and if you need to worry about the next few months of spending or not.

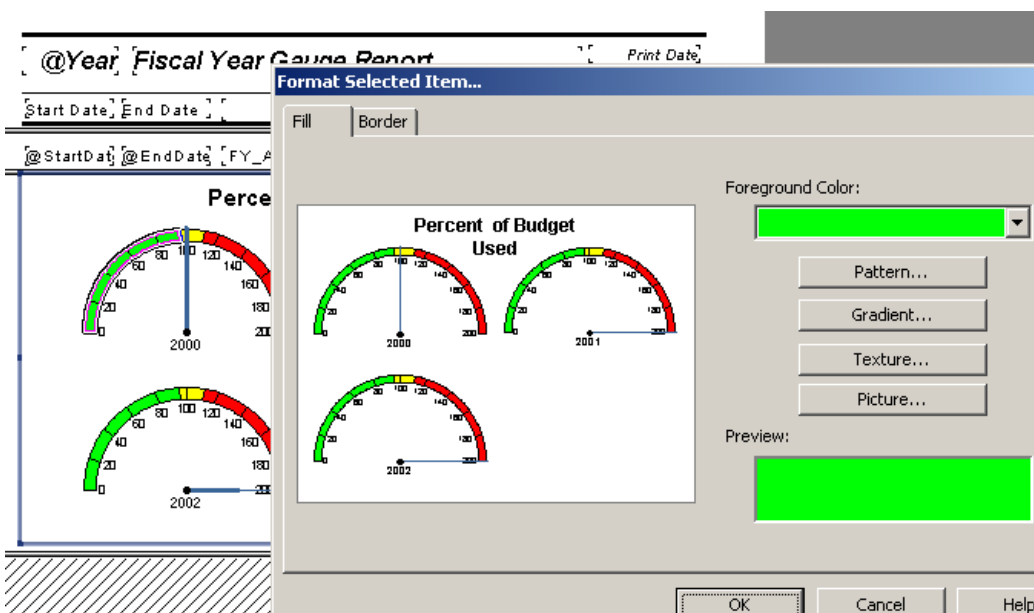
In the *Work* report folder open the **Fiscal Year Gauge Report (DashBudgetYearGauge.rpt)**. The report is set up as follows:



1. To select the colors in the gauge, right click on the gauge chart box.
2. Select *Chart Options*.
3. Click on the "Quality Bands" tab. You can set up to 5 "bands" or ranges of values.
4. Click OK to save.




5. For each band to have an individual color, you have to click each individual band to highlight.
6. Right click and select "Format Selected Item...".
7. Choose the Foreground Color.
8. Click OK.



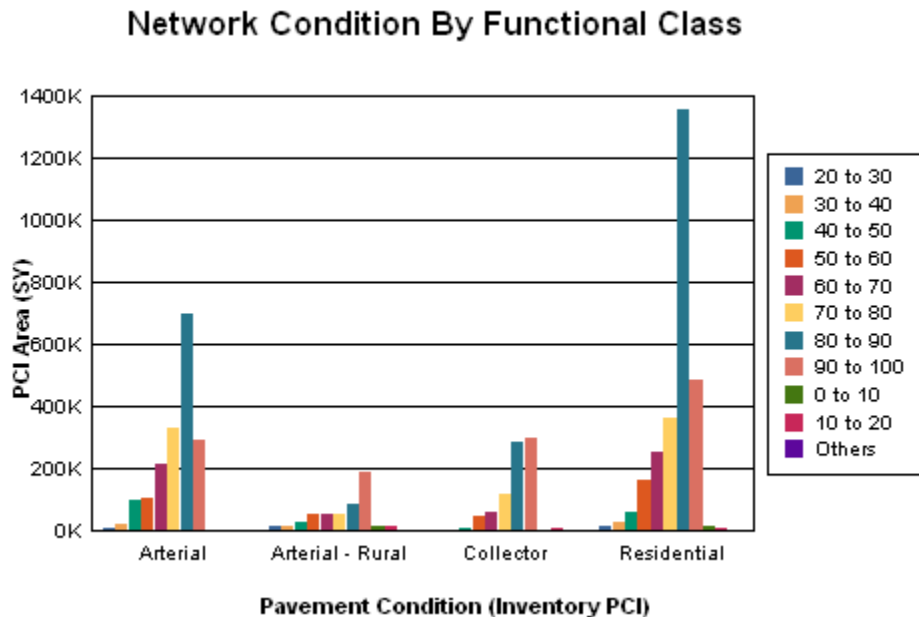


## Cross - Tabs

**Cross-Tab**  is a row and column object that can be helpful in creating a type of spreadsheet. It is also useful in creating and modifying graphs.

It was necessary to use a **Cross-Tab** object to fix some graphs that were originally created using just the Crystal Chart option.

One graph looked like this:



As you can clearly see, the chart legend poses the most obvious issue. The placement of the bars is an additional concern. The “0 to 10”, “10 to 20”, and “Others” bars are placed after the “90 to 100” bar instead of before the “20 to 30” bar.

“This behavior occurs because Crystal Reports takes the first grouping in the data set and creates a sorted view of this data before creating the graph. When this first grouping does not contain all the possible items to be shown in the legend, Crystal Reports will sort the selection and add any new items to the end of the legend list.”

<http://technicalsupport.businessobjects.com>

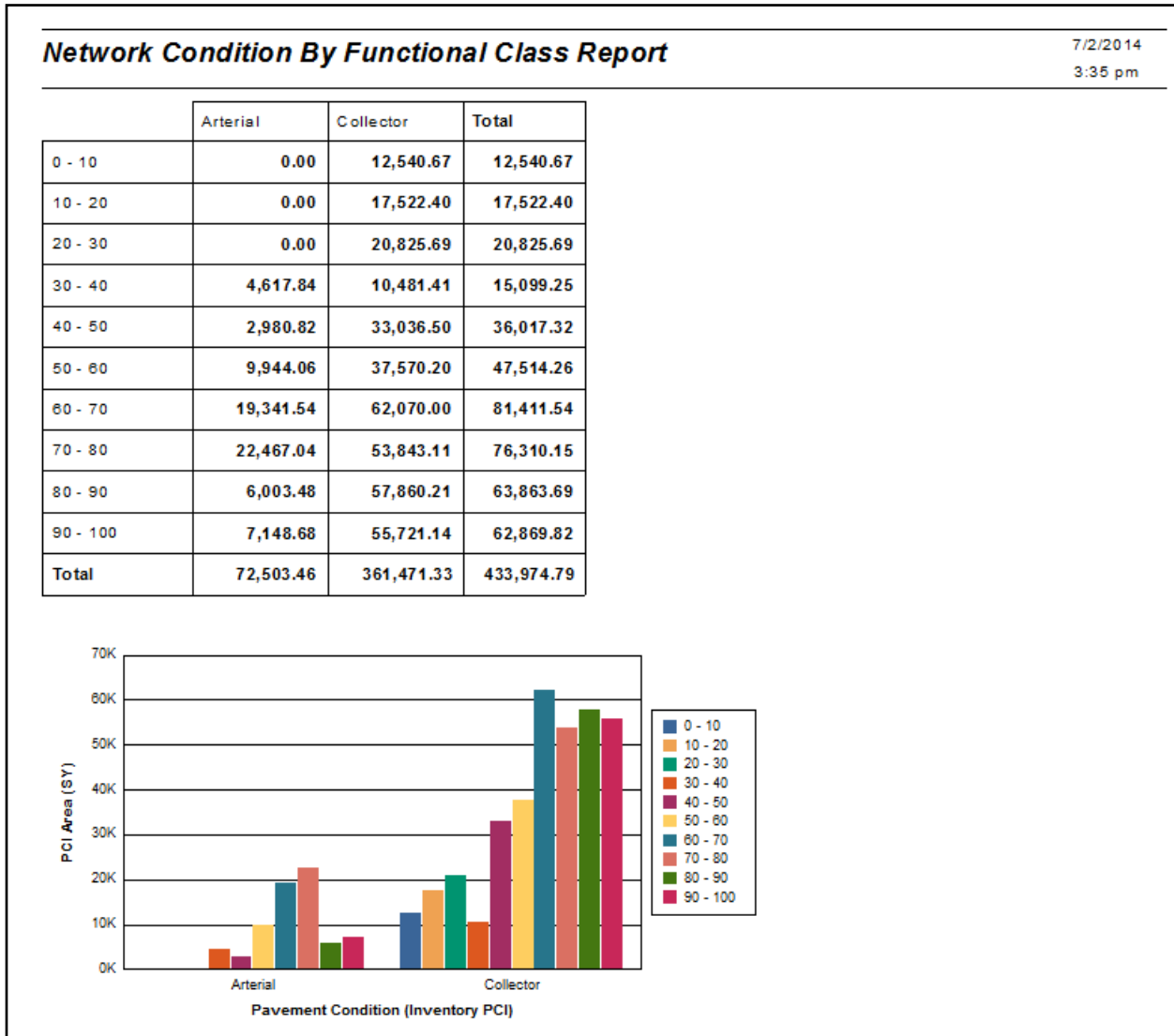
The **Arterial** grouping did not have bars for “0 to 10”, “10 to 20” or “Others”. Thus, the legend was created without these ranges. As additional groupings were added, the legend picked up the missing PCI values.

A **Cross-Tab** object was used to correct these issues.

## Creating a Cross-Tab Report

We will create a Cross-Tab report for Street Pavement Conditions to be run in the **Pavement Manager>>Field Inspections** module. A cross-tab object can be brought into an existing report or a new report can be created using the Cross-Tab Report Wizard.

Report to be created:

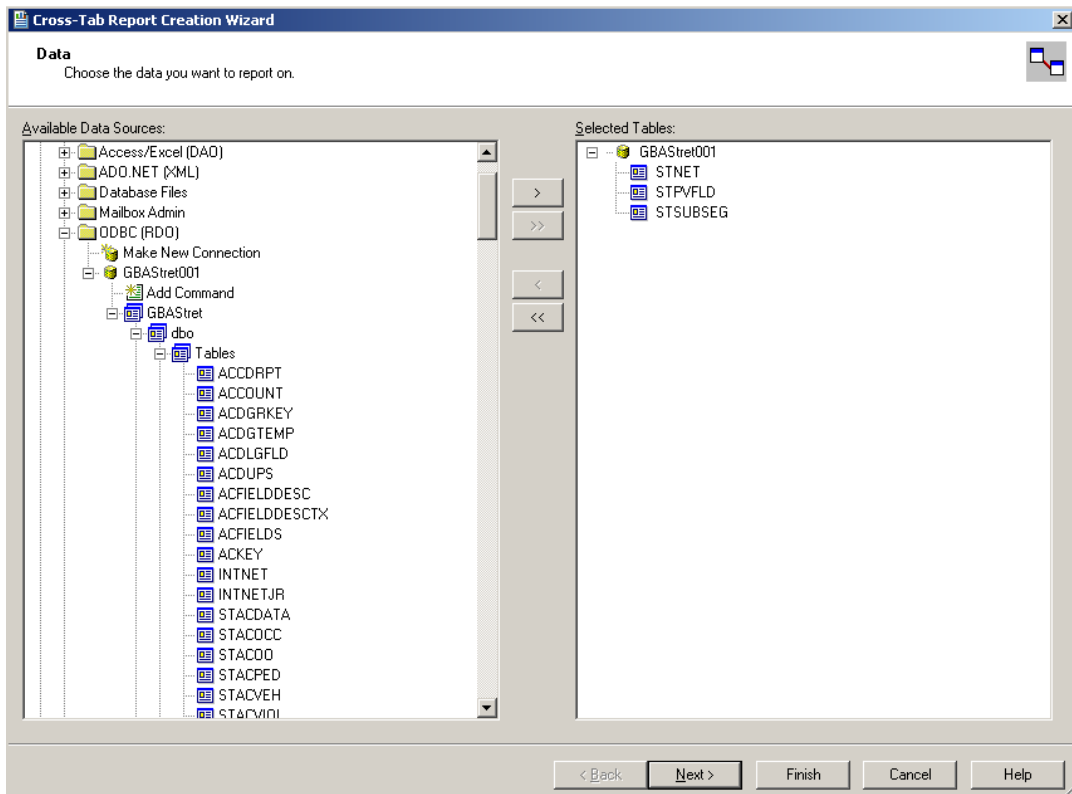


This module has fields utilizing several tables so it would be worthwhile to check **Field Definitions** to make sure we bring in all of the pertinent tables.

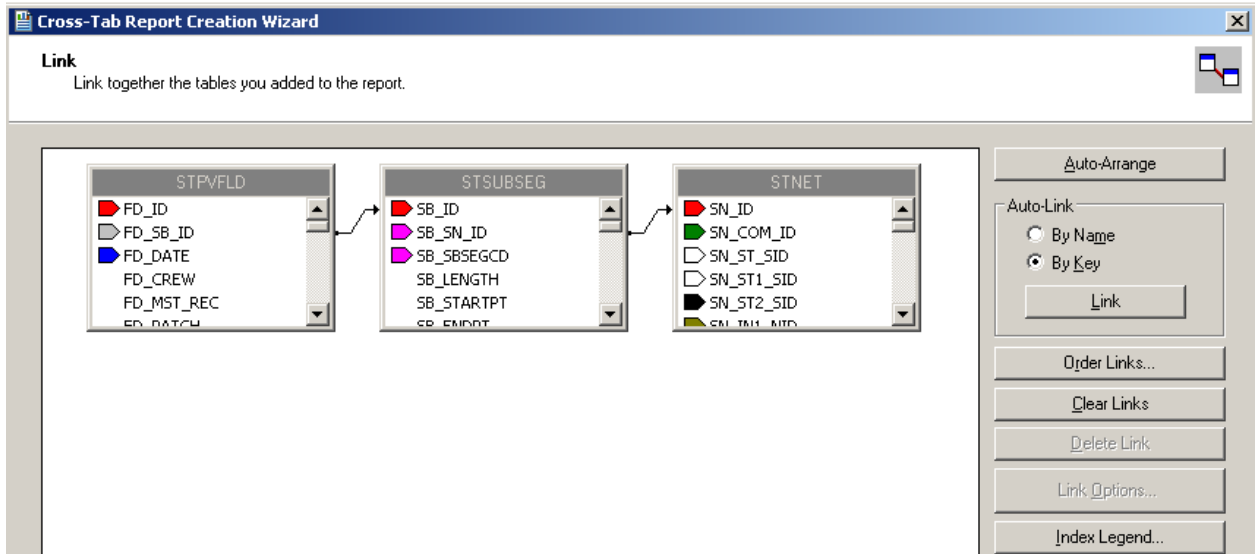
We will be using the following fields:

- Inventory PCI (STPVFLD\_FD\_PCI)
- Total Area (STSUBSEG\_SB\_TAREA)
- Street Classification (STNET\_SN\_CLAS\_TY)

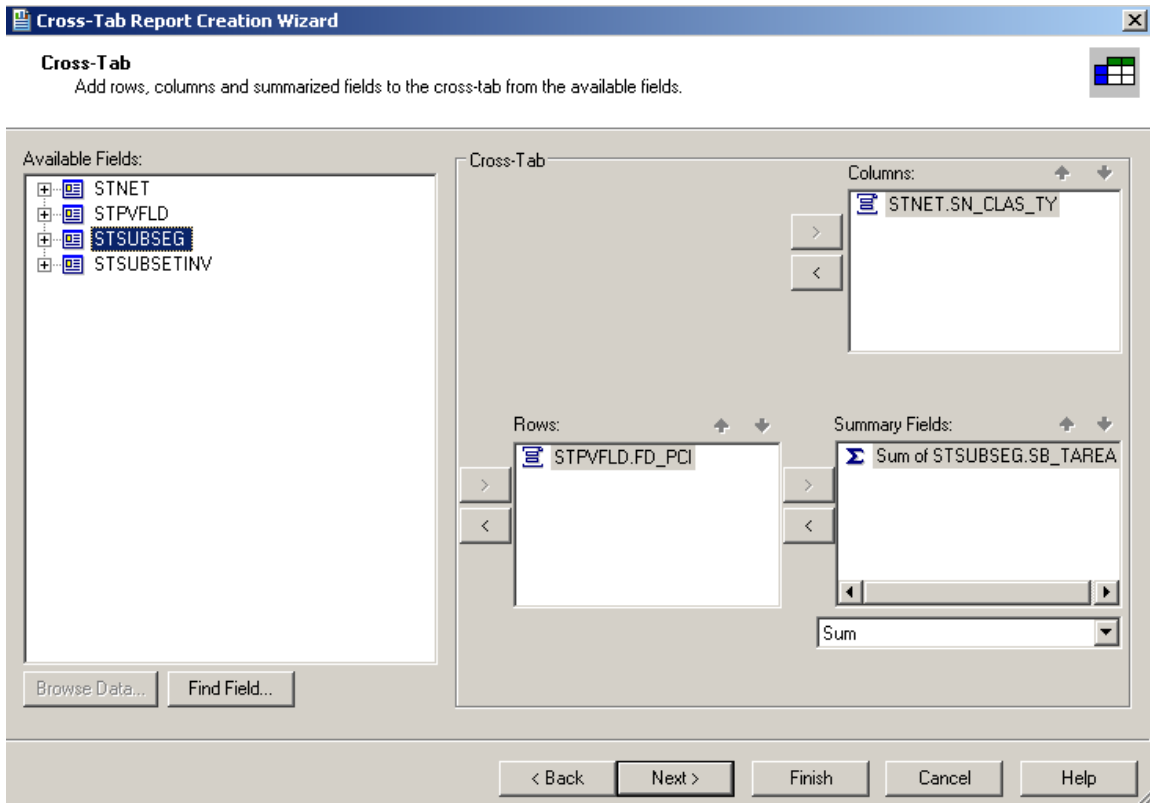
1. Open Crystal Reports and select *New Reports >> Cross-Tab Report Wizard*.
2. Expand *Create New Connection*.
3. Open *ODBC (RDO)*.
4. Within *Data Source Selection* select **GBAStret001** >> *Finish* (You may need to provide User Name and Password here).
5. Move the necessary tables from *Available Data Sources* to *Selected Tables*.



6. Click **Next** and link as follows. Remember to “Left Outer Join” between tables.

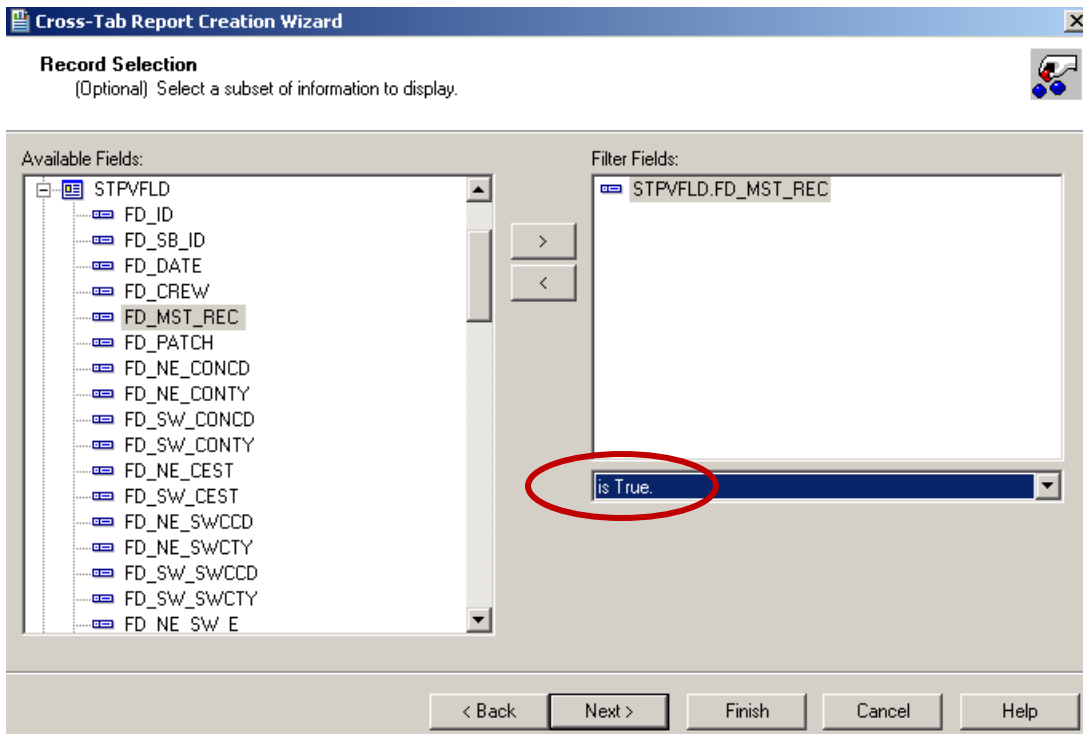


7. Click **Next**. Set up the *Columns*, *Rows*, and *Summary Fields* as follows:



8. Click **Next**. At this time, we will skip the charting option.

9. Click **Next**. We would like to filter for the Most Recent Records (**STPVFLD.FD\_MST\_REC**).



10. Click **Next**. Leave the Grid Style as *Original*.
11. Click **Finish**.
12. Save the report in the **Street** report folder as **LC\_PCIClass.rpt**.

A report has been created.

This is the Cross-Tab object that has been created.

	Arterial	Collector	Residential	Total
6.90	<b>0.00</b>	<b>1,267.33</b>	<b>0.00</b>	<b>1,267.33</b>
7.75	<b>0.00</b>	<b>3,830.56</b>	<b>0.00</b>	<b>3,830.56</b>
8.45	<b>0.00</b>	<b>458.22</b>	<b>0.00</b>	<b>458.22</b>
8.90	<b>0.00</b>	<b>1,022.33</b>	<b>0.00</b>	<b>1,022.33</b>

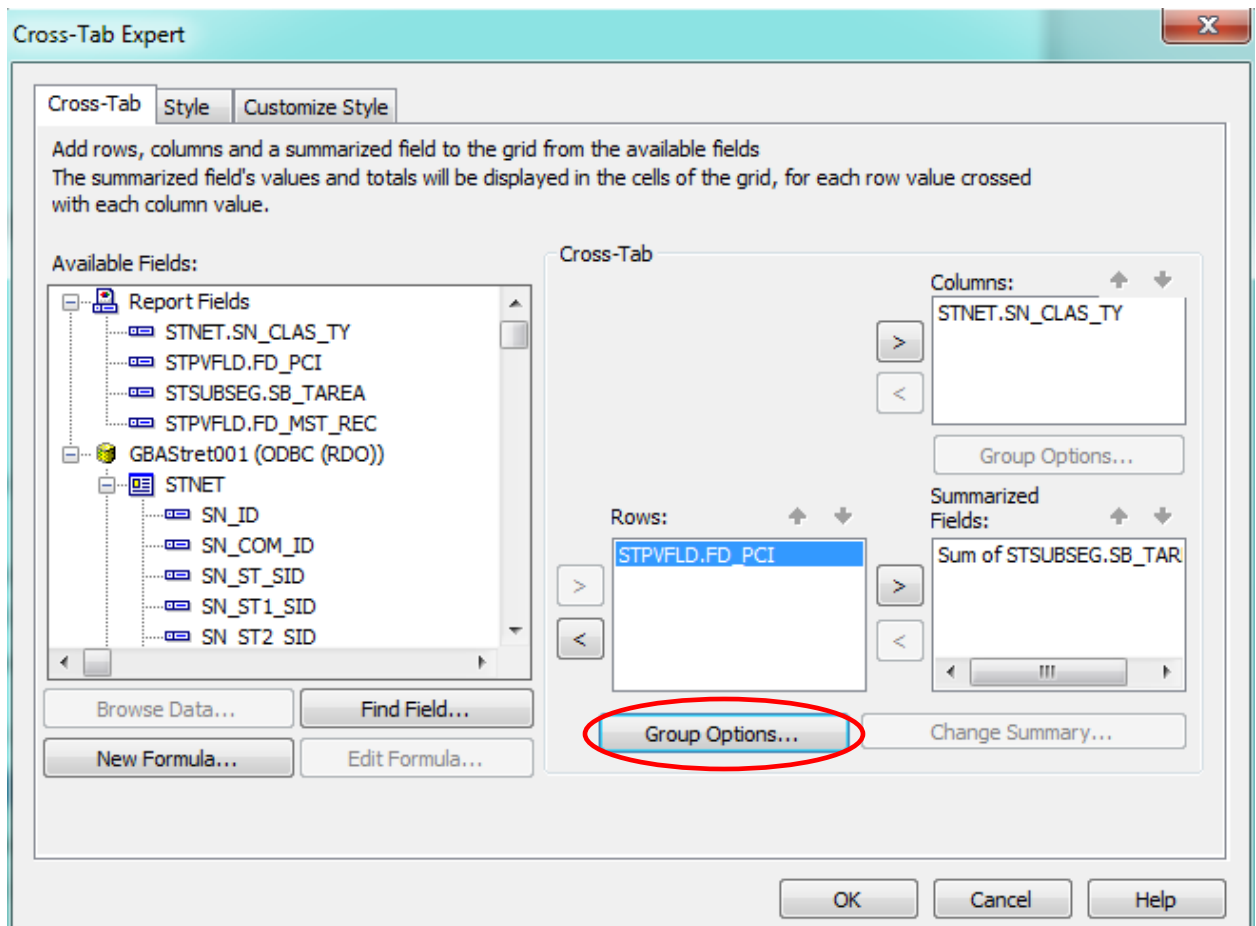
It shows every PCI value (6.9, 7.75, 8.45...). We would like to group the PCI values to make the data more manageable.

## Cross-Tab Expert, Grouping

There are various options that can be set up in the Cross-Tab Expert.

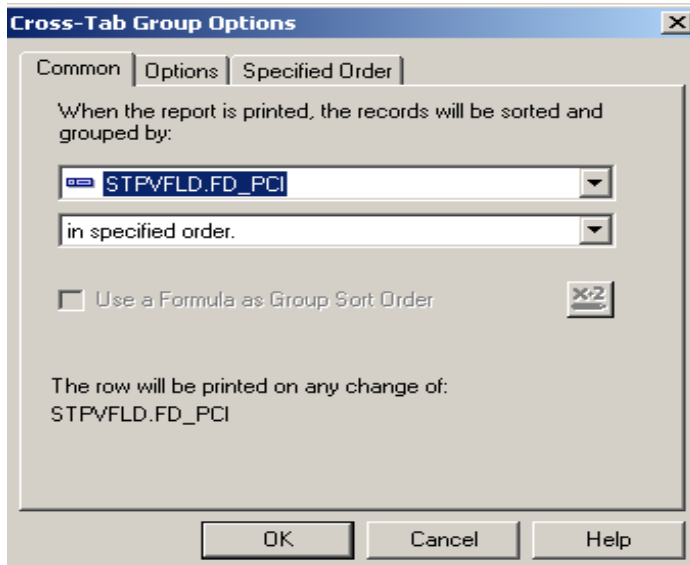
At this time the *Group Options...* will be set up.

1. Right click in the empty top-left corner of the table and select **Cross-Tab Expert...**
2. Click on the **STPVFLD.FD\_PCI** field in the **Rows** box to highlight it.

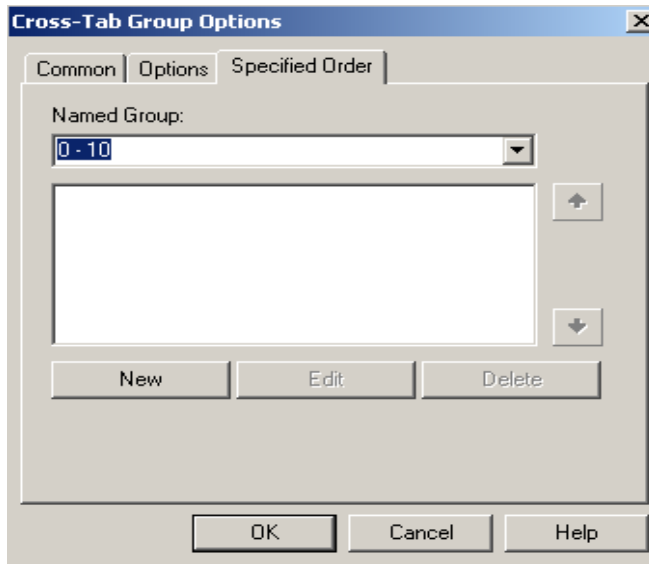


3. Click on **Group Options...** This will open the various grouping options that we have previously used.

- Using the drop down box below the field name, select “in specified order”.

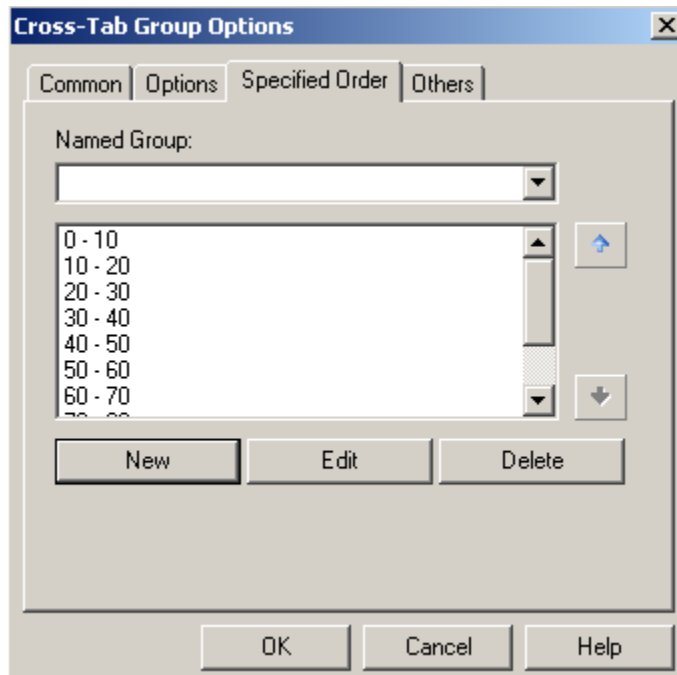
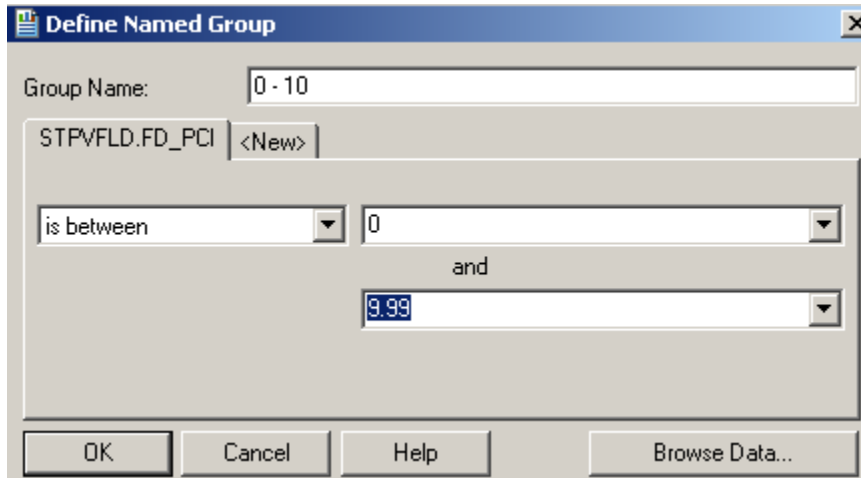


- This should take you to the **Specified Order** tab. If that tab does not open, click on the tab name.
- Enter the first group name.
  - “0 - 10”



- Click **New**. (Or, you can click **New** and enter the group name in the **Define Named Group** box.)

8. Select “is between” from the drop down box. Two boxes appear allowing you to set the upper and lower limits of the group. Enter the appropriate values.
9. Click **OK** and continue the process until all of the ranges have been entered.



10. Click **OK**
11. Click **OK** again to close the *Cross-Tab Expert*.



The report now looks like this:

	Arterial	Collector	Residential	Total
0 - 10	<b>0.00</b>	<b>12,541.26</b>	<b>0.00</b>	<b>12,541.26</b>
10 - 20	<b>1,766.33</b>	<b>15,337.62</b>	<b>0.00</b>	<b>17,103.95</b>
20 - 30	<b>0.00</b>	<b>18,502.09</b>	<b>0.00</b>	<b>18,502.09</b>
30 - 40	<b>4,617.84</b>	<b>7,977.52</b>	<b>470.56</b>	<b>13,065.92</b>
40 - 50	<b>2,980.82</b>	<b>9,800.53</b>	<b>535.83</b>	<b>13,317.18</b>
50 - 60	<b>11,124.56</b>	<b>54,284.62</b>	<b>0.00</b>	<b>65,409.18</b>
60 - 70	<b>46,264.87</b>	#####	<b>1,285.56</b>	#####
70 - 80	<b>23,614.21</b>	<b>57,101.67</b>	<b>0.00</b>	<b>80,715.88</b>
80 - 90	<b>6,003.48</b>	#####	<b>0.00</b>	#####
90 - 100	<b>7,148.68</b>	<b>70,989.21</b>	<b>779.72</b>	<b>78,917.61</b>
Others	<b>0.00</b>	<b>28,380.30</b>	<b>0.00</b>	<b>28,380.30</b>
<b>Total</b>	#####	#####	<b>3,071.67</b>	#####

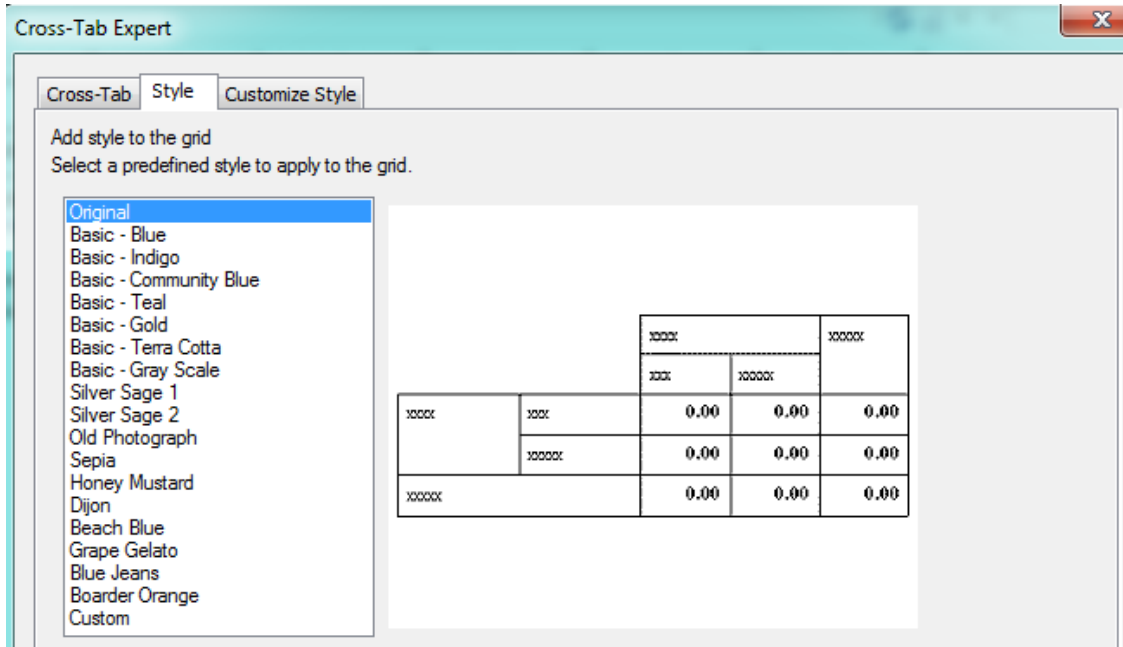
To see all of the number fields, the cells size will need to be increased.

12. Click on one of the blocked out fields (#####). This will activate the sizing handles.
13. Click and drag the sizing handle to increase the width of the cell. All of the cells for this field will increase in size.
14. Change the Column titles to Bold, right aligned and the Area values beneath to not bold.
15. Save

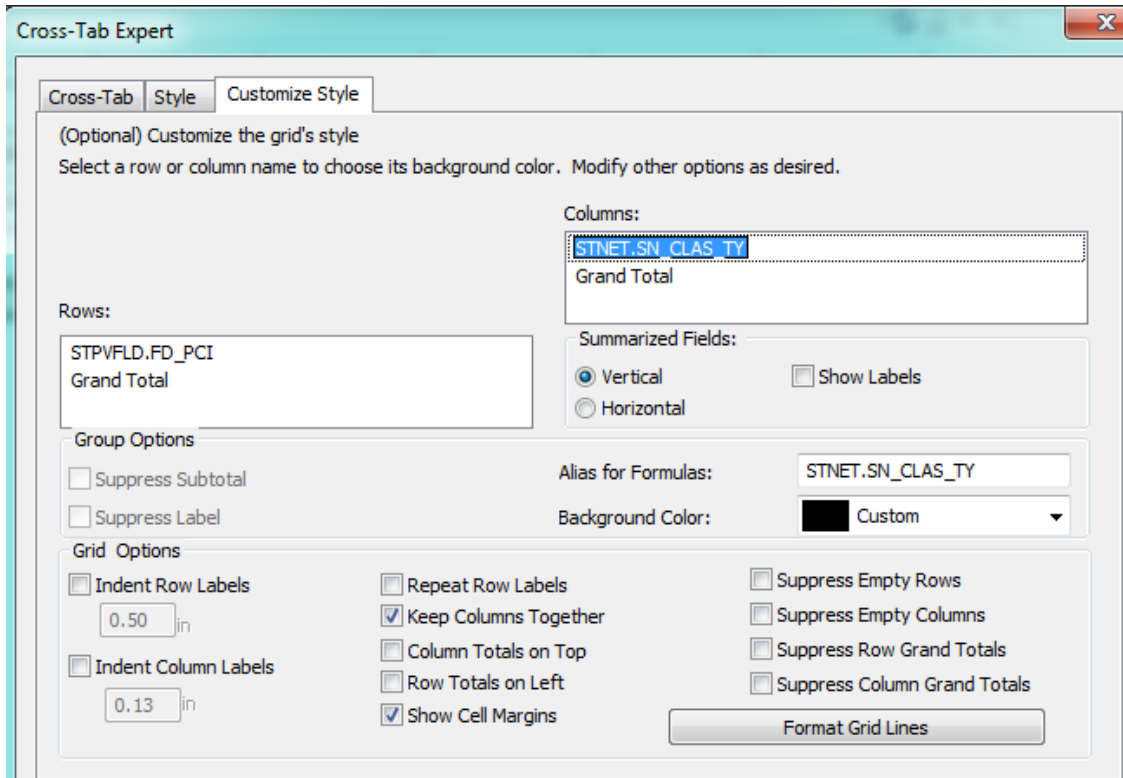
	<b>Arterial</b>	<b>Collector</b>	<b>Residential</b>	<b>Total</b>
0 - 10	0.00	12,541.26	0.00	<b>12,541.26</b>
10 - 20	1,766.33	15,337.62	0.00	<b>17,103.95</b>
20 - 30	0.00	18,502.09	0.00	<b>18,502.09</b>
30 - 40	4,617.84	7,977.52	470.56	<b>13,065.92</b>
40 - 50	2,980.82	9,800.53	535.83	<b>13,317.18</b>
50 - 60	11,124.56	54,284.62	0.00	<b>65,409.18</b>
60 - 70	46,264.87	110,258.58	1,285.56	<b>157,809.01</b>
70 - 80	23,614.21	57,101.67	0.00	<b>80,715.88</b>
80 - 90	6,003.48	104,884.68	0.00	<b>110,888.16</b>
90 - 100	7,148.68	70,989.21	779.72	<b>78,917.61</b>
Others	0.00	28,380.30	0.00	<b>28,380.30</b>
<b>Total</b>	<b>103,520.79</b>	<b>490,058.08</b>	<b>3,071.67</b>	<b>596,650.54</b>

These Cross-Tab options are worth reviewing. The style might catch the eye of the reader to tempt them to read the data.

## Cross-Tab Expert, Style




## Cross-Tab Expert, Customize Style

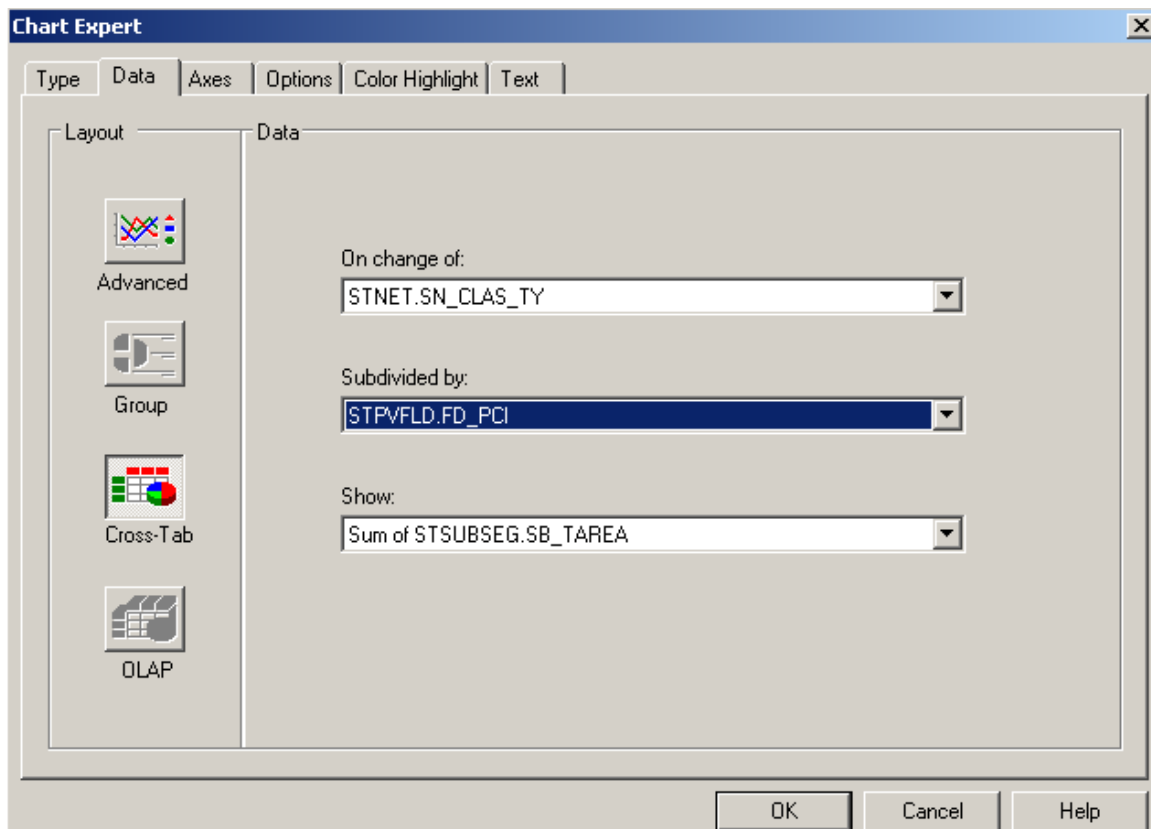


Example 25A

## Graph Using Cross-Tab Data

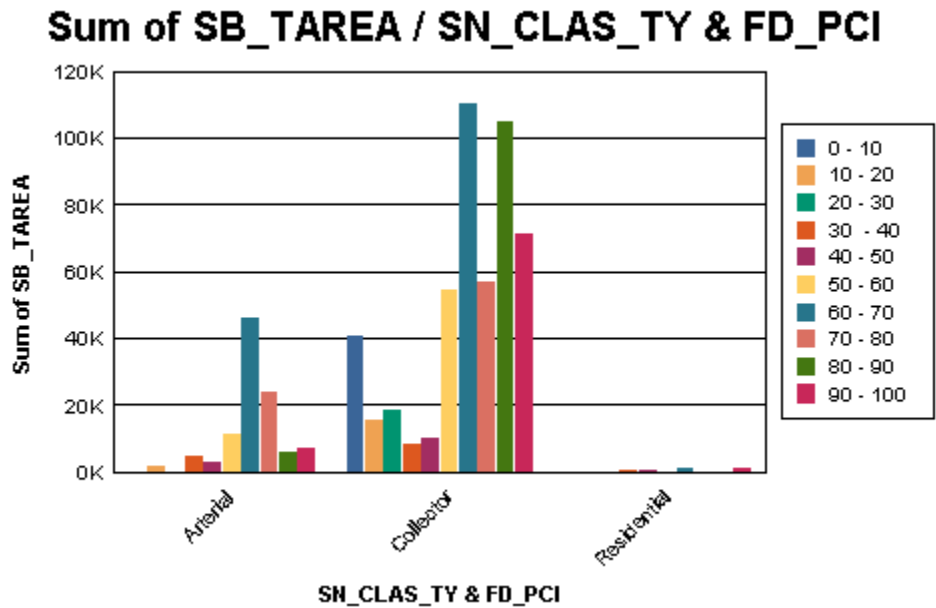
We will now create a graph using the information from the **Cross Tab** object created in the previous example.

1. Click on the report *Design* tab and increase the size of the *Report Footer* section to about 3”.
2. Click on **Insert Chart**  or click on **Insert** and then **Chart**.
3. Click the chart box frame into the *Report Footer* section.
4. The **Chart Expert** dialogue opens.
5. In the **Data** tab select **Cross-Tab**.
6. Use the drop down arrows to choose the appropriate fields and formulas.

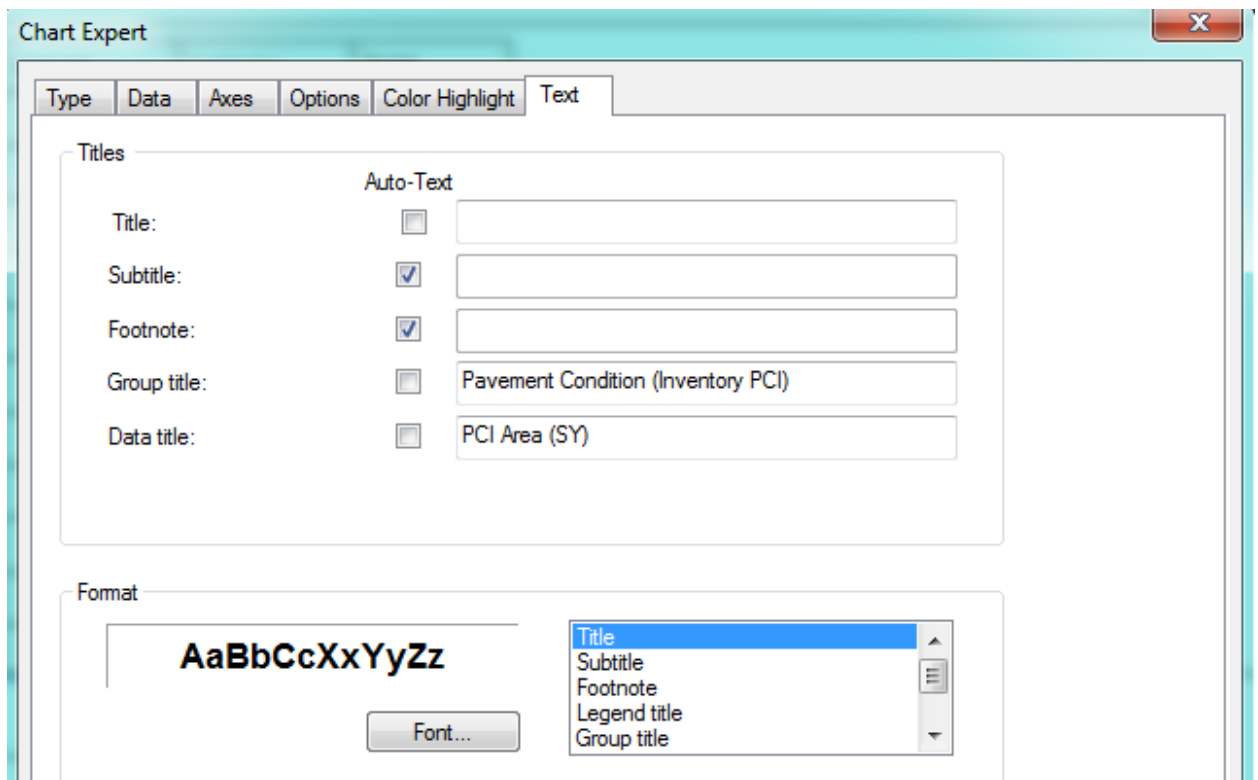


7. Click **OK**.

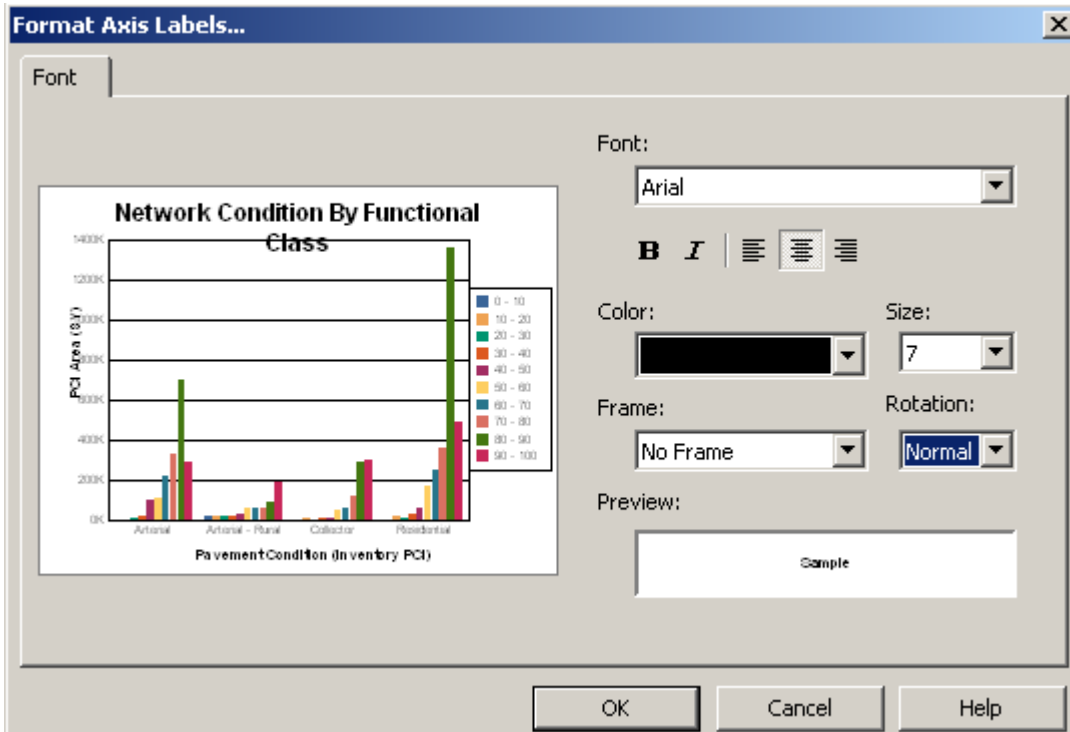
The chart now looks like this:



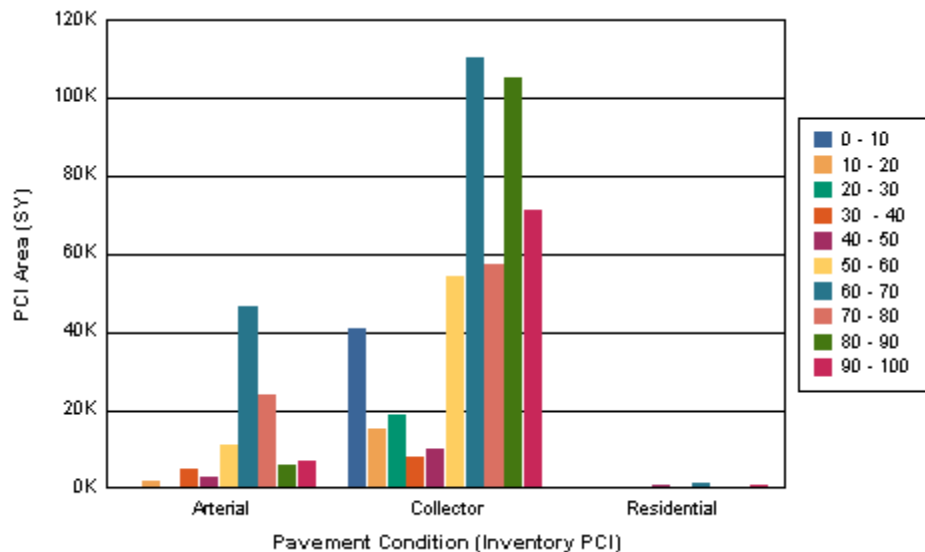
- The Chart Expert can be used to modify the titles (Text tab).



9. To read the Group axis (x-axis) horizontally, click on one of the titles.
10. Right click and select **Format Axis Label**.
11. Change the rotation to **Normal**.

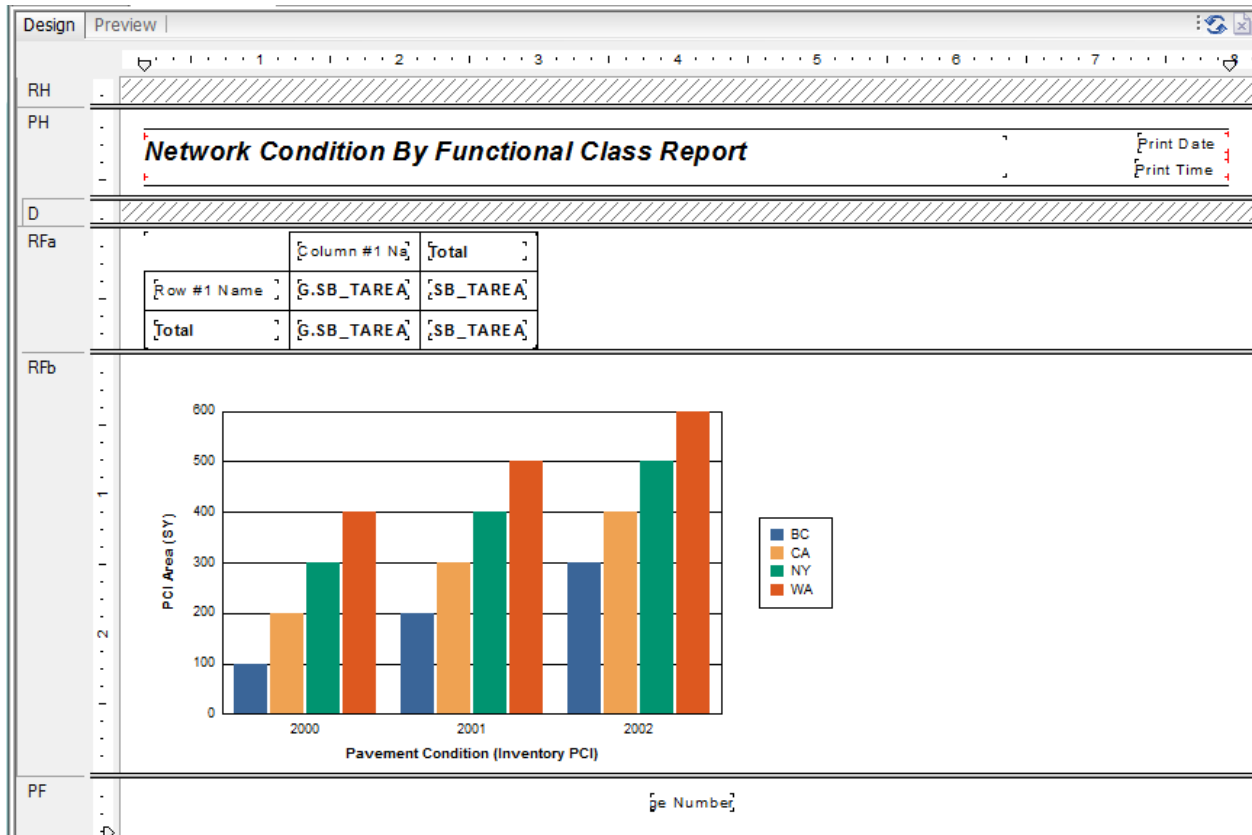


12. Click **OK**. The changes will be applied to the chart.



13. The Cross-Tab object can be left at the top of the report in the Report Header, moved to the Report Footer or it can be suppressed, leaving the graph on its own.

Clean up modifications will probably be necessary such as the Report Title, date and time.



14. Save the report in the Street folder as **LC\_PCIClass.rpt**.

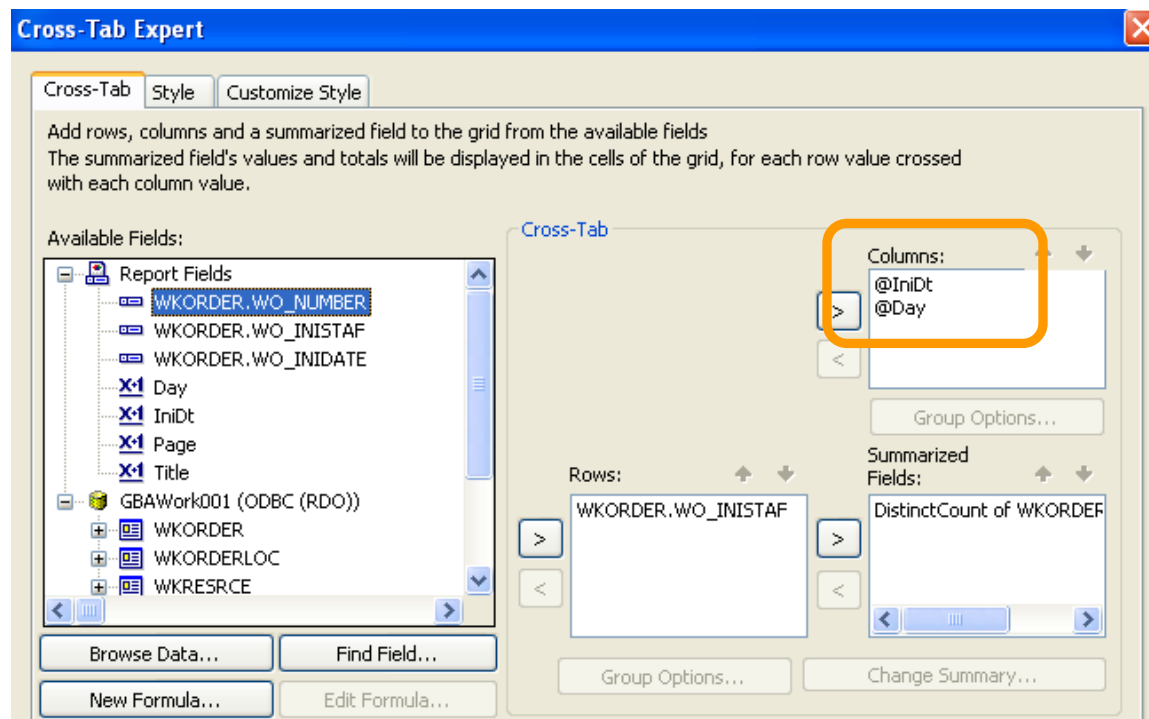
*Note: "Because cross-tabs are calculated during the first report pass (While Reading Records), you cannot use second-pass formulas in cross-tabs. You can use only formulas that calculate during the first pass. However, you can base a chart or a map on a cross-tab, because cross-tabs are processed before charts and maps." The Complete Reference Crystal Reports 10, Peck, 2004*

Example 26A

## Cross-Tab Dates

This report shows the number of Work Orders a person created in a specific date range. It shows the number for each day and day of the week.

<b>Work Order Count Report</b>			
?Report Subtitle			
@Title			
GH1	Group #1 Name		
D	WO_NUMBER	WO_INISTAF	@IniDt
GF1a	ORDER.WO_NUMBER		
GF1b	WO_INISTAF		
RF		Column #1 Name	Total
		In #2 Name	Total
	Row #1 Name	NUMBER	NUMBER
	Total	NUMBER	NUMBER



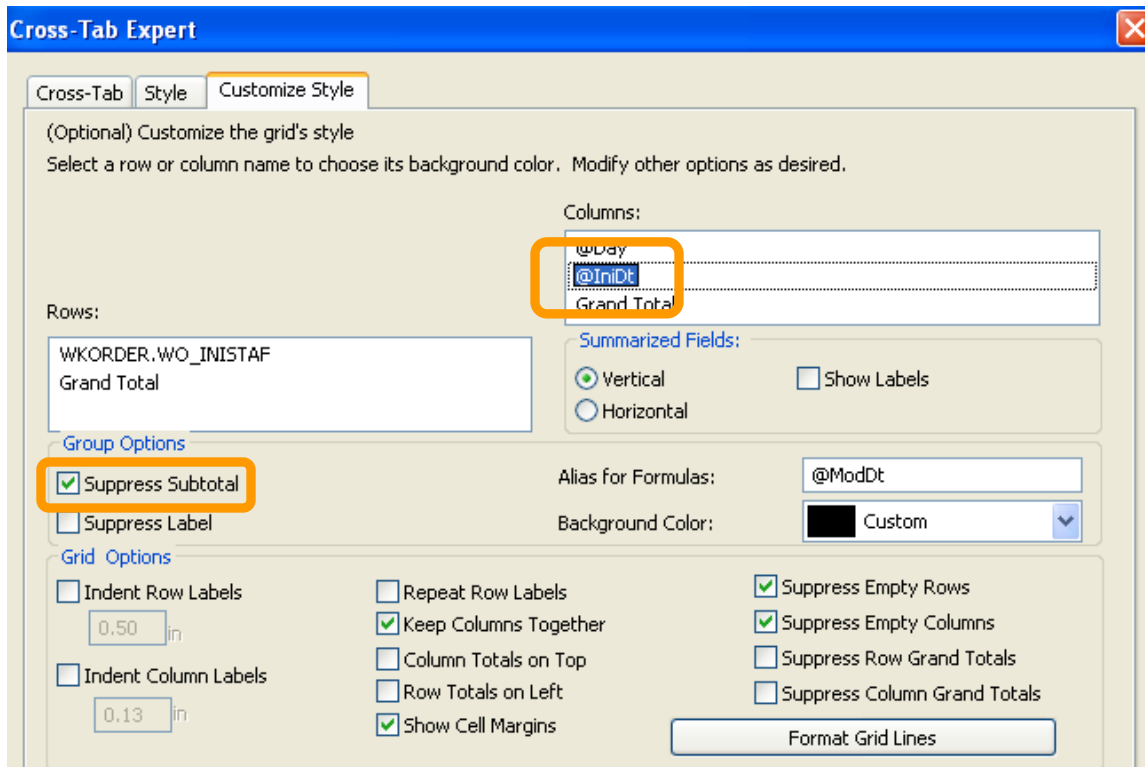
**IniDt formula:**

Date({WKORDER.WO\_INIDATE})

**Day formula:**

["Sun", "Mon", "Tues", "Wed", "Thur", "Fri", "Sat"] [DayOfWeek({@IniDt})]

In the *Customize* Tab make sure the *Suppress Subtotal* box is checked.



## Work Order Count Report

7/1/2010 To 8/30/2010

	7/22/10	7/28/10	Total
	Thur	Wed	
<b>pthomas</b>	0	1	1
<b>ycortez</b>	1	0	1
<b>Total</b>	1	1	2

To format the date field, you can right click on the date field and choose *Format Field* then click on the *Date* tab and select the formatting.



## Cross-Tab Column and Row Titles

		Leave Type				
		Administrative Leave	Docked Family Leave	Docked Unexcused	Family Leave Holiday	Family Leave Sick
Employee	Ben Burges	0	0	0	0	0
	David Gossman	0	0	0	0	2.00

The titles “**Leave Type**” and “**Employee**” are part of the Cross-Tab. Formulas were created for the titles:

**@Leave Type**

“Leave Type”

**@Employee**

“Employee”

Then the cross-tab uses the formulas as the first field in the Columns and Rows choices.

