Infographics Toolkit
Design Specification
Group #2

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PROJECT OBJECTIVES

The infographics toolkit defined in this specification meets several objectives. First, it provides report designers with the ability to customize visualizations in reports. An infographic is intended to facilitate communication of the main message that a report or visualization is attempting to convey (Krum, 2013). Therefore, report designers can use the toolkit to improve (i.e., speed and clarity) communication of report content.

Definitions

Infographics: Graphical representation consisting of several visual elements (e.g., images, graphs, and text) combined to communicate a message.

Visualization: Line, Column, or Pie chart that summarizes the data.

TARGET USER

The target audience for this toolkit are report designers who use a SAS-provided web client to generate dynamic reports for executives in companies or organizations and publicly viewable reports on government operations. Report designers are assumed to have basic statistical knowledge and likely are educated in disciplines such as business administration or communication. They will have some domain knowledge and context on report content. However, report designers are not experts in SAS, advanced statistics or analytics, or programming languages. In the next section, a profile of the target user is provided to give context to toolkit usage.

Fictitious User Profile

Jenna T. – 36 year old Female

Jenna has been a Data analyst for the North Carolina State Government for 5 years. One of her duties is generating data reports for Government officials. Jenna is comfortable with using a SAS web client, but she despises command-line and syntax-based analytic applications. She'd rather use a graphical-style interface to work instead of memorizing complex syntax. Officials rely on Jenna's reports to make important decisions. Furthermore, they present these reports to other officials during meetings. Some have expressed to Jenna that although her reports are accurate, some reports are too complex and take a long time for people to understand the intended message. Officials sit in long meetings throughout the day and desire to reduce meeting time by being more efficient (e.g., faster updates from attendees). Jenna noticed that the most recent software release have an infographics toolkit. She wants to impress her supervisors by improving the look and comprehensibility of her reports. She decides to use the toolkit to make her reports more aesthetically-pleasing and reduce the time people need to understand the data. Currently, the State is closely monitoring Raleigh's fire departments due to a recent increase in fires in the city. She has an upcoming deadline for generating an important report regarding the Raleigh Fire departments.

SUPPORTED USE CASES

We selected several use cases from the provided SAS use case document and supported these use cases in the Balsamiq wireframe prototype. Below, the selected use cases are described.

Use case 3: Replace pie slices with an image

Using this feature, the designer can replace the slices inside a pie chart with relevant images. This eliminates the need to read text and provides a faster and more aesthetically pleasing way to convey information.

Rationale behind selecting this use case: By implementing this feature, we can make the pie charts more interesting. We can show images instead of showing ordinary pie slices to improve comprehension and to provide some context to the data being presented.

Use case 4: Connect an image or other visualization to a element in a visualization

Using this feature, the designer can add images to a visualization to provide some context that can help in the comprehension of the visualization. An example of this is shown in Figure 1.

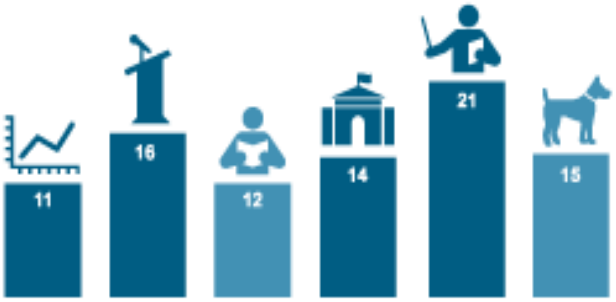

Figure 1: Images connected to bars in a bar chart

In the above example, the columns of a column chart have associated images. The images provide some additional context that facilitates comprehension. Additionally, they make the infographic more aesthetically pleasing compared to simple columns.

Rationale behind selecting this use case: We chose this use case because we think this is an efficient way of communicating context to the user without making infographics too complex. We were drawn to the simplicity yet effectiveness of this particular use case.

Use case 5: Customized visualization, images, and text in tooltips.

This feature allows the designer to make custom tooltips that can convey different types of information. For example instead of just showing text in the tooltip, the designer has the freedom to choose between

custom formatted text, image, another visualization or a structured query result. Furthermore, they can manipulate various tooltip properties to make tooltips as they please. An example is shown in Figure 2.

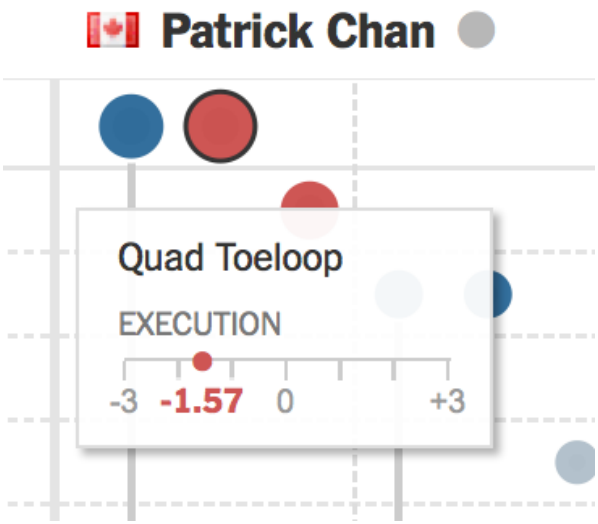

Figure 2: Tooltip with a visualization

Rationale behind selecting this use case: We think tooltips can be a very powerful and effective way of conveying context and in cases extra information to the user. Also they do not require that any structural changes be made to the visualization as their visibility can be controlled (e.g., show on hover). By adding support for different types of content inside a tooltip we further increase the effectiveness of the tooltip.

Use case 7: Use overlaid or masking images to provide decoration or context

By using this feature the designer can overlay infographics objects onto an image, this can be helpful when there is some contextual overlap between the visualization data and the image because the image can provide an affordance to better understand the meaning of the data. Also it makes the reports more aesthetically pleasing.

Rationale behind selecting this use case: We chose this use case because we believe that using images as a background provides a different perspective to the infographics as compared to using a simple, color background. It gives the designers more control over the manner in which they want the data to be conveyed. Also contextually relevant images and their interaction with the visualizations can facilitate comprehension. Lastly, images give a different personality to reports. They break up the monotony of simple data visualizations and draw viewers' attention.

Use case 15: Images and custom content in filtering controls.

This use case allows the designer to link multiple relevant visualizations to one common control scheme. The benefit of this is that multiple sets of relevant visualization can be shown in one place and hence

different story lines can be shown using this (example shown Figure 3). **Note: This use case is supported in the high-fidelity prototype only.**

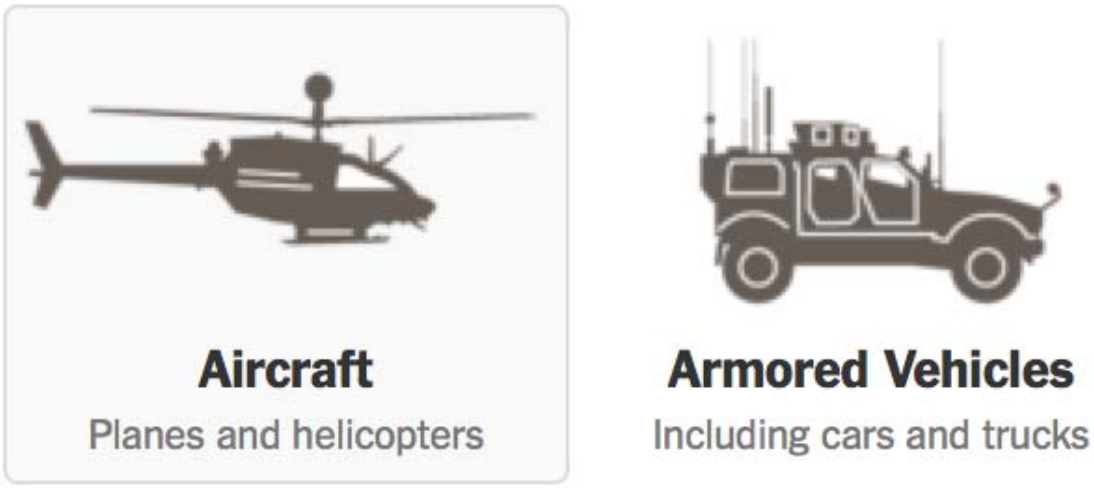

Figure 3: Images used for filtering controls

In the above image Aircraft and Armored Vehicles are two control buttons that can be used to show two different types of data visualizations that share the same context of military vehicles or combat.

Rationale behind selecting this use case: We chose this use case because we think this feature can really increase the amount of information being presented in the infographics without making the infographics overwhelming. By allowing the user to control what information they want to see, the designer can make the infographics more engaging.

EXPERIENTIAL GOALS

Our goals were to develop a software design that is both useful and has good usability. We want the experience of using our software to be simple, intuitive and effective.

We want the user to feel as though he/she is in control while using the software. We also want to provide them with tools and options that give them freedom to customize reports. We have aimed at minimizing any restrictions in the workflow of the software.

Lastly, since it is an infographic toolkit, we want the software to be aesthetically pleasing and pleasant to use. Our goal has been to be thorough in designing the task breakdowns so that all users can grasp the functional understanding of the software just by looking at it.

DESIGN RATIONALE

Balsamiq Prototype/Wireframe: In our wireframe prototype we have focused on showing a detailed breakdown of all components involved in a particular use case. We have made use of wizards in order to do a step-by-step walkthrough. We think from that design perspective for a prototype, it will be more beneficial to show how the software transitions from one screen to another so that users can understand how the software works. We have tried our best to make sure that there are no loops in the workflow that will leave the user trapped in the workflow.

High Fidelity Prototype: Although we followed a wizard approach in our wireframe prototype, in the high fidelity prototype that we have coded, we took an approach that is based more on direct manipulation of elements on the screen and the ability to change properties on the fly. We believe modern software should have more direct manipulation, such as the ability to drag objects, click on objects to manipulate properties, and resize elements on canvas. We think that these functions increase ease-of-use. We have implemented these features in our code. However, we have not shown these in the wireframe prototype because Balsamiq does not support these types of transitions.

SUPPORTED TASKS

In order to demonstrate the use cases and the design of our prototype, we will be building a simulated infographic which will showcase all the features relevant to the task.

Task 1: Onboarding Task

This task involves selecting the dataset and data within a dataset, which will be used to create visualizations, infographics, images, and text in reports. The next task is changing the background color of the canvas. The last task is creating a report title using a text box.

Step1: Open toolkit application. (See Table 1 for overview on areas labeled with red text boxes.)

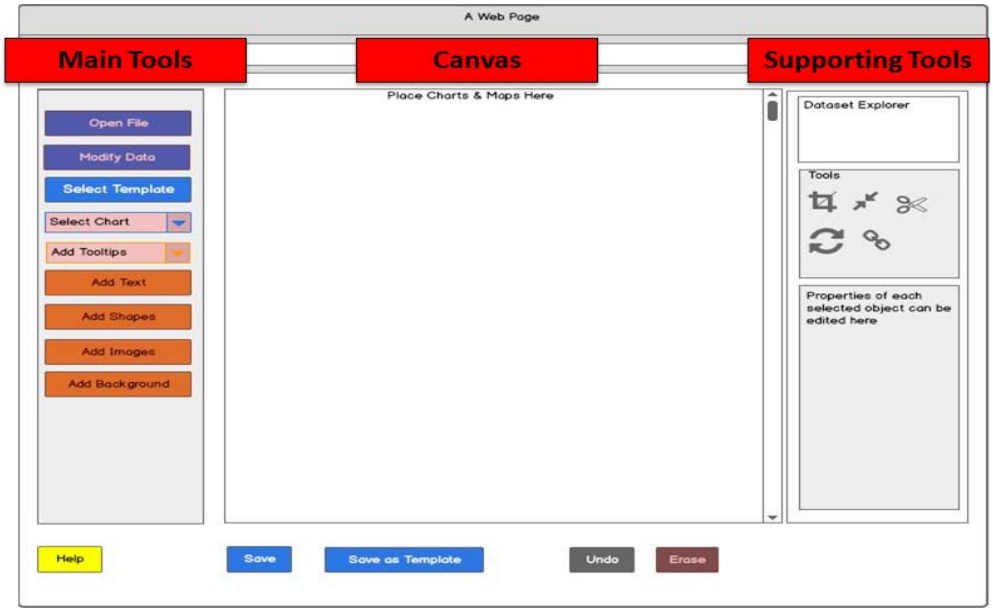

Figure 4: Main Screen

Display Area	Behavior	Notes
Main Tools	Provides options to select dataset and data and create visualizations and infographics.	"Modify Data" is grayed out (disabled) if a dataset has not been selected.
Canvas	Area in which all visualizations and infographics are placed. This area displays reports and infographics that are being built.	
Supporting Tools		
Dataset Explorer	Displays file names of datasets. The filename displayed in orange font is the active dataset (i.e., currently selected). A user can click on the other filenames to change the active dataset.	
Tools	Provides tools such as cut, copy, refresh, collapse.	
Properties window: Properties of each selected object can be edited here	When a user clicks/selects visualizations, infographics, images, or text, the properties associated with the selected object will be displayed here. Properties can be changed here.	

Subtask: Select Data

Step 1: Click "Open File" button. Displays a dialog box with tabs across the top **(Figure 5)**. "Select Dataset" is selected when "Open File" is clicked. This box shows a list of datasets saved (i.e., on local drive, flash drive, cloud, etc.).

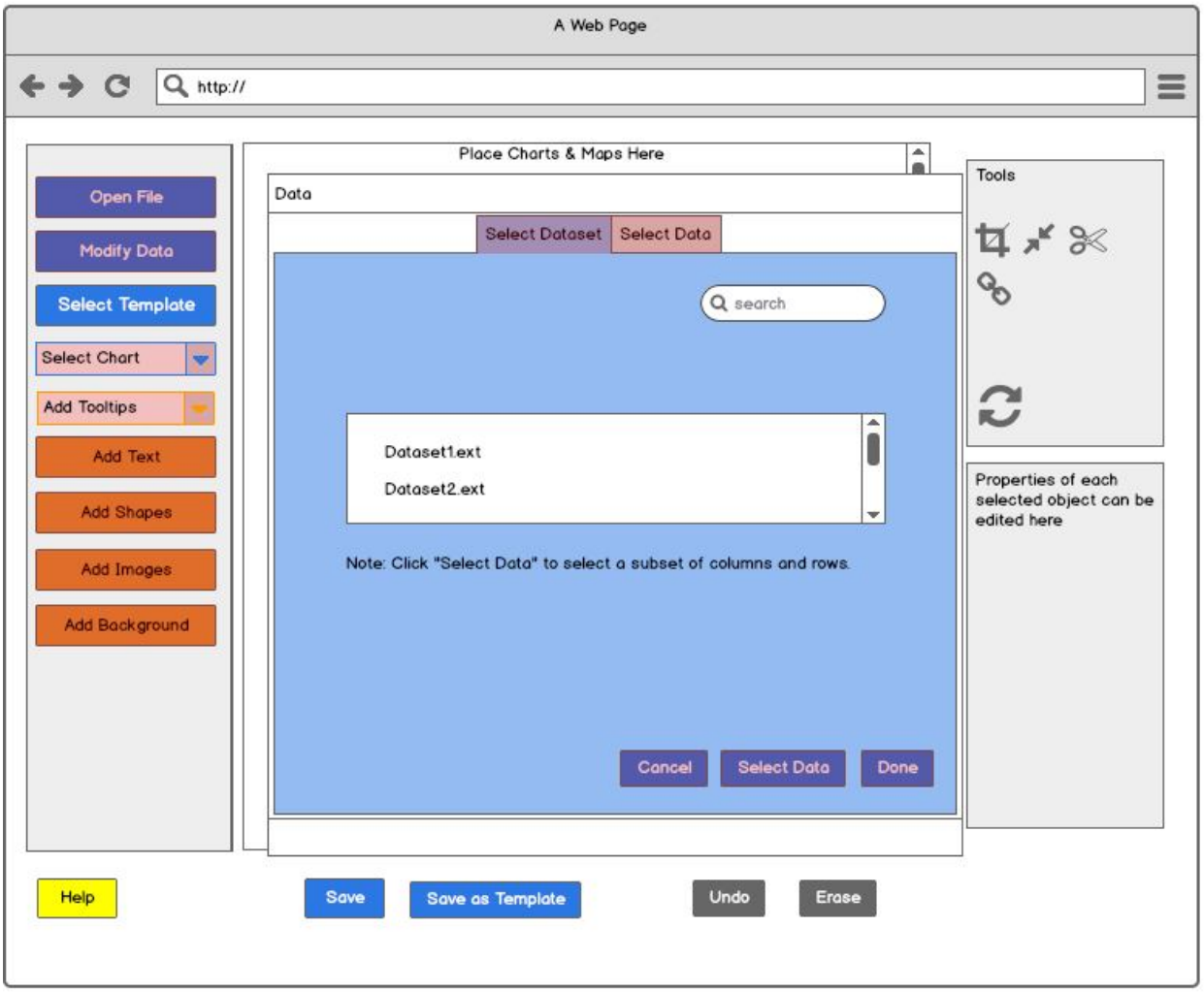

Figure 5: Select Dataset dialog

Step 2: Click dataset name in list. A user selects the dataset he/she wants to use to build visualizations and/or connect to infographics.

Step 3: Click on "Select Data" tab button. "Select Data" tab and button are grayed out (disabled) until a dataset has been selected. "Cancel" returns user back to previous screen. "Select Data" shows a dialog box to allow users to select a subset of columns and rows within a dataset (Figure 6).

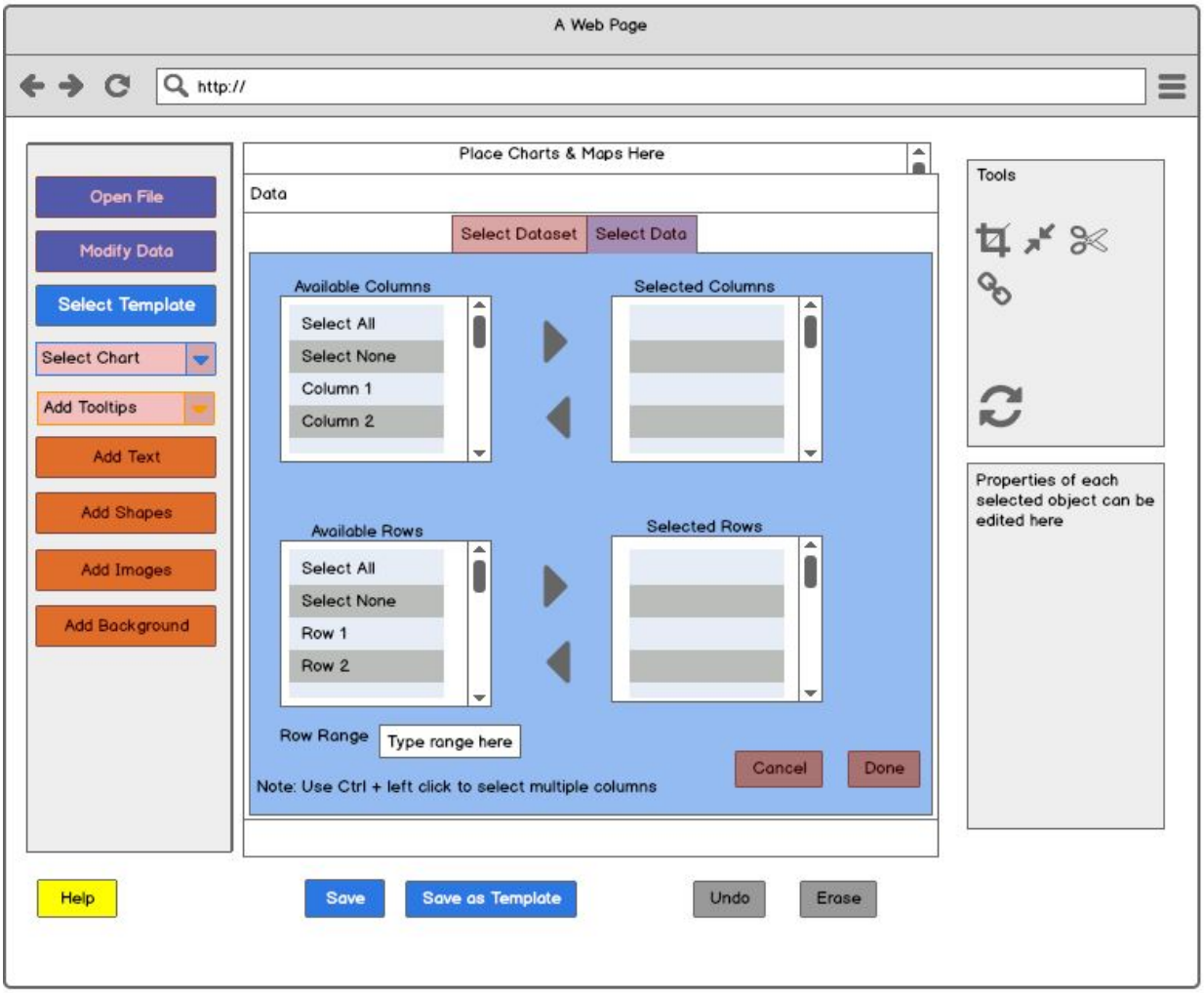

Figure 6: Select Data dialog

Step 4: Click appropriate column(s). The "Available Columns" scrolling list box shows available variables in a dataset. "Select None" deselects items that have been selected. "Column 1" represents the first column/variable, etc.

Step 5: Press right arrow button to move column to right box. A user must select an item (variable) and click the right arrow on the right to move the variable into the "Selected Columns" scrolling list box. The left arrow is used to remove selected items (variables) from "Selected Columns."

[Optional: Click "Select All" rows] "Select All" will select all columns/variables in a dataset.

Step 6: Click appropriate row(s). The "Available Rows" scrolling list box shows available records in a dataset. The behavior is the same as noted for "Available Columns."

Step 7: Press right arrow button to move row to right box. The behavior is same as noted for "Available Rows."

Step 8: Click "Done" button. "Done" must be clicked to saves the user's dataset and data selections.

Subtask: Change Background

Step 1: Click "Add Background" button. The dialog box shows properties of the background (Figure 7).

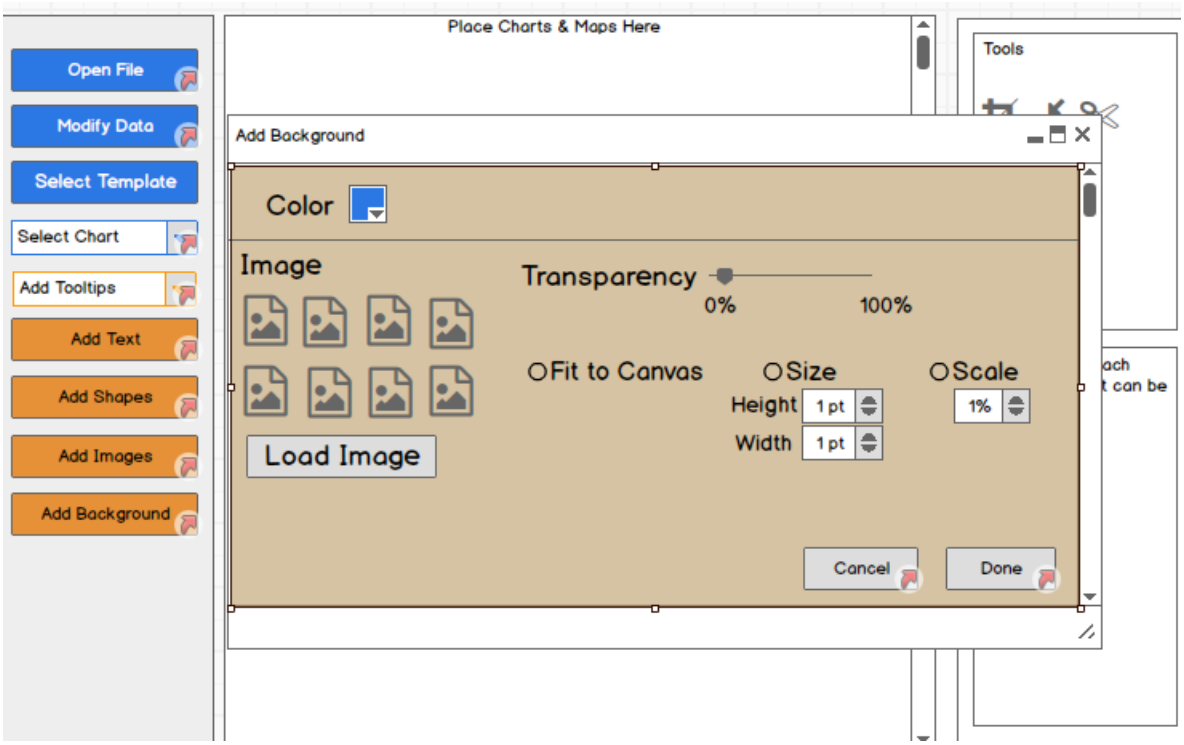

Figure 7: Add background dialog

Step 2: Click "Color" picker. "Color" picker will display colors in a grid. [Not shown in prototype.].

Step 3: Select color. [Screen not shown in prototype.]

Step 4: Click "Done" button. Saves user's selection. The screen will show the newly-selected canvas color (Figure 8).

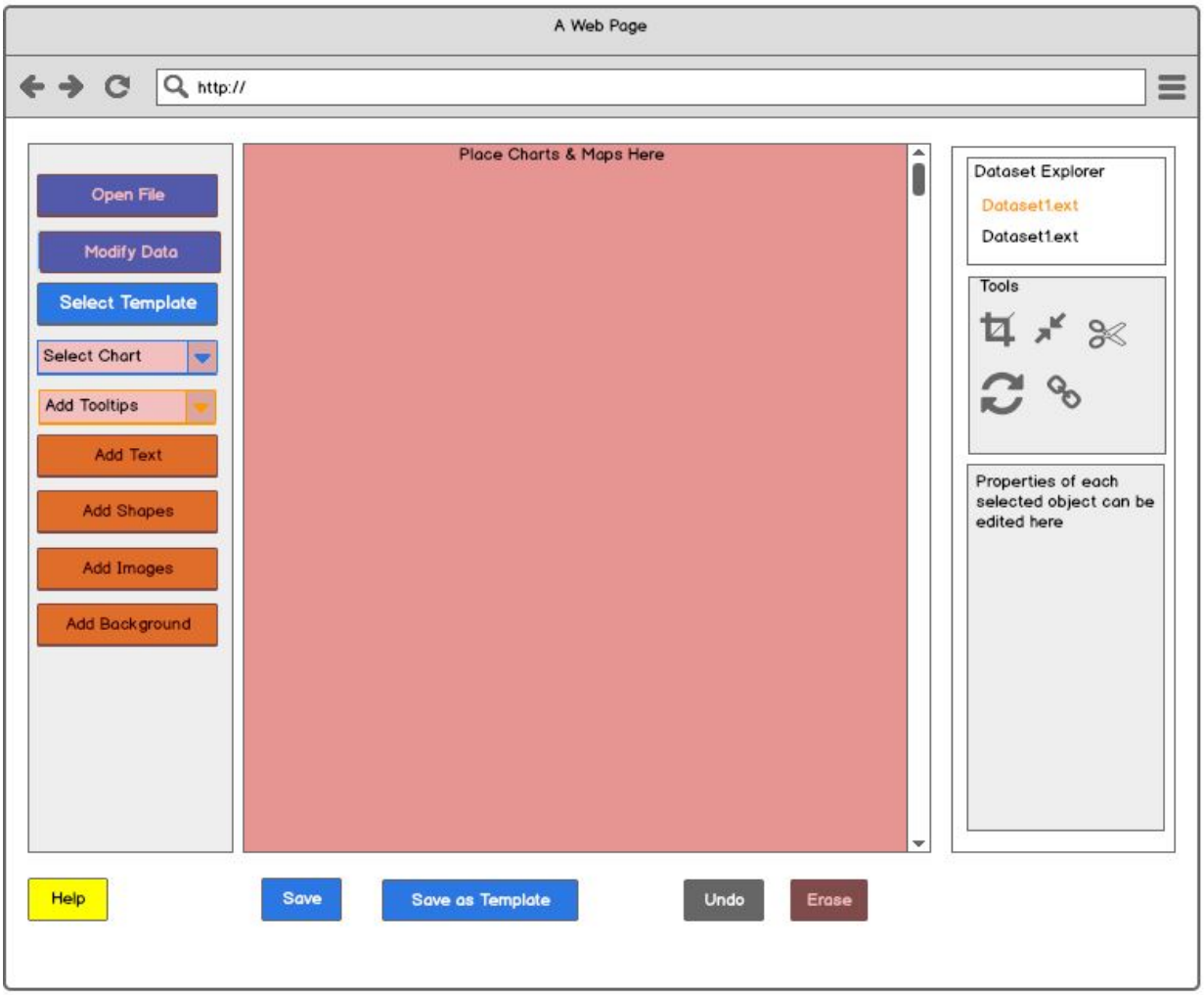

Figure 8: Background color changed

Subtask: Add Text (Title)

Step 1: Click "Add Text" button (adds text box to canvas). Adds a text box to the canvas (Figure 9). The user can use direct manipulation to move the text box [not available on Balsamiq prototype].

Step 2: Select text box to edit text. [Screen not shown in Balsamiq prototype.]

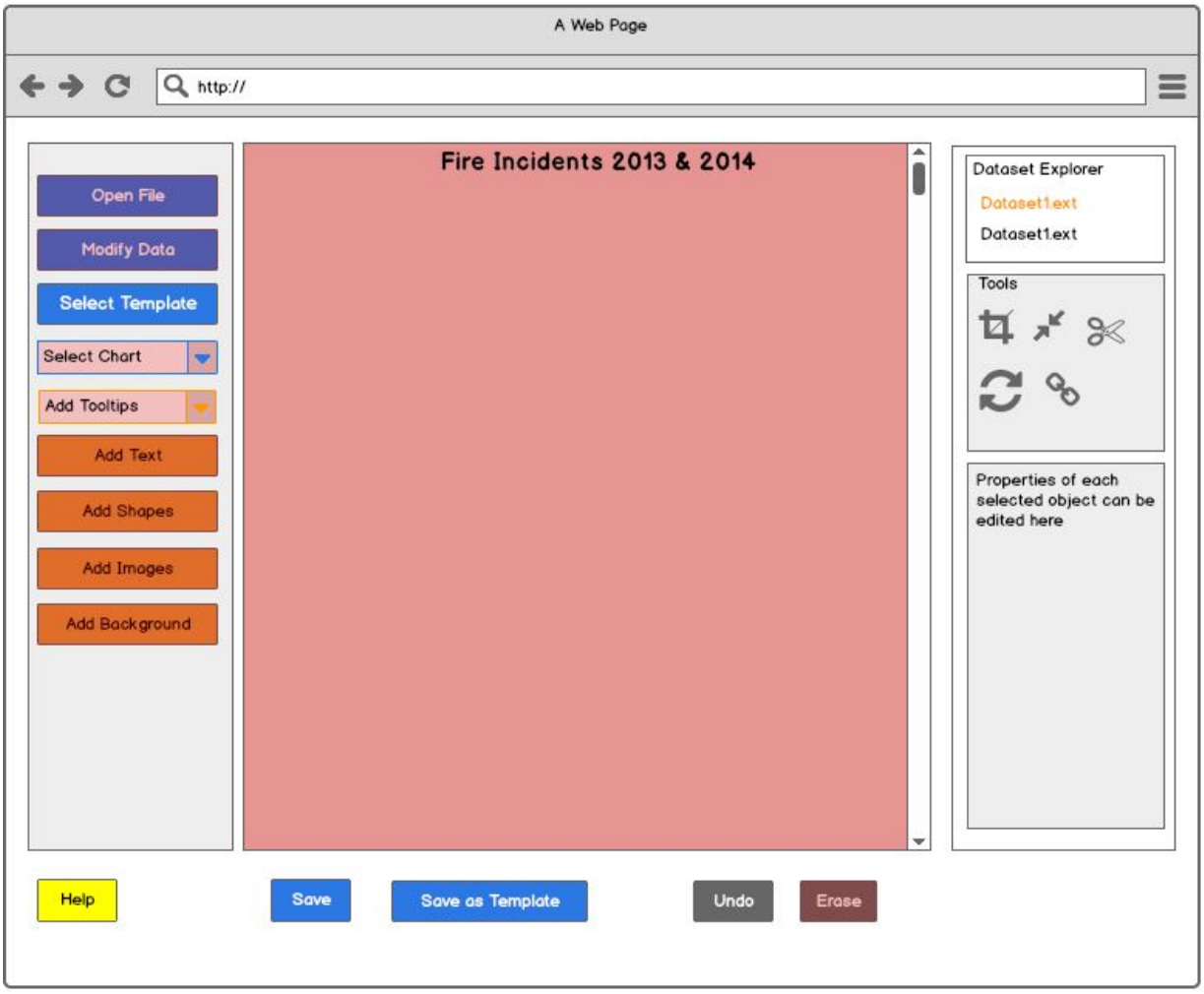

Figure 9: Title text added

Task 2: Add Visualizations and Image

This task involves adding visualizations to the main canvas in order to make the infographic. The subtasks involved are adding multiple visualizations and an image to the canvas. We will provide a detailed breakdown of each task and explain the dialogue box options.

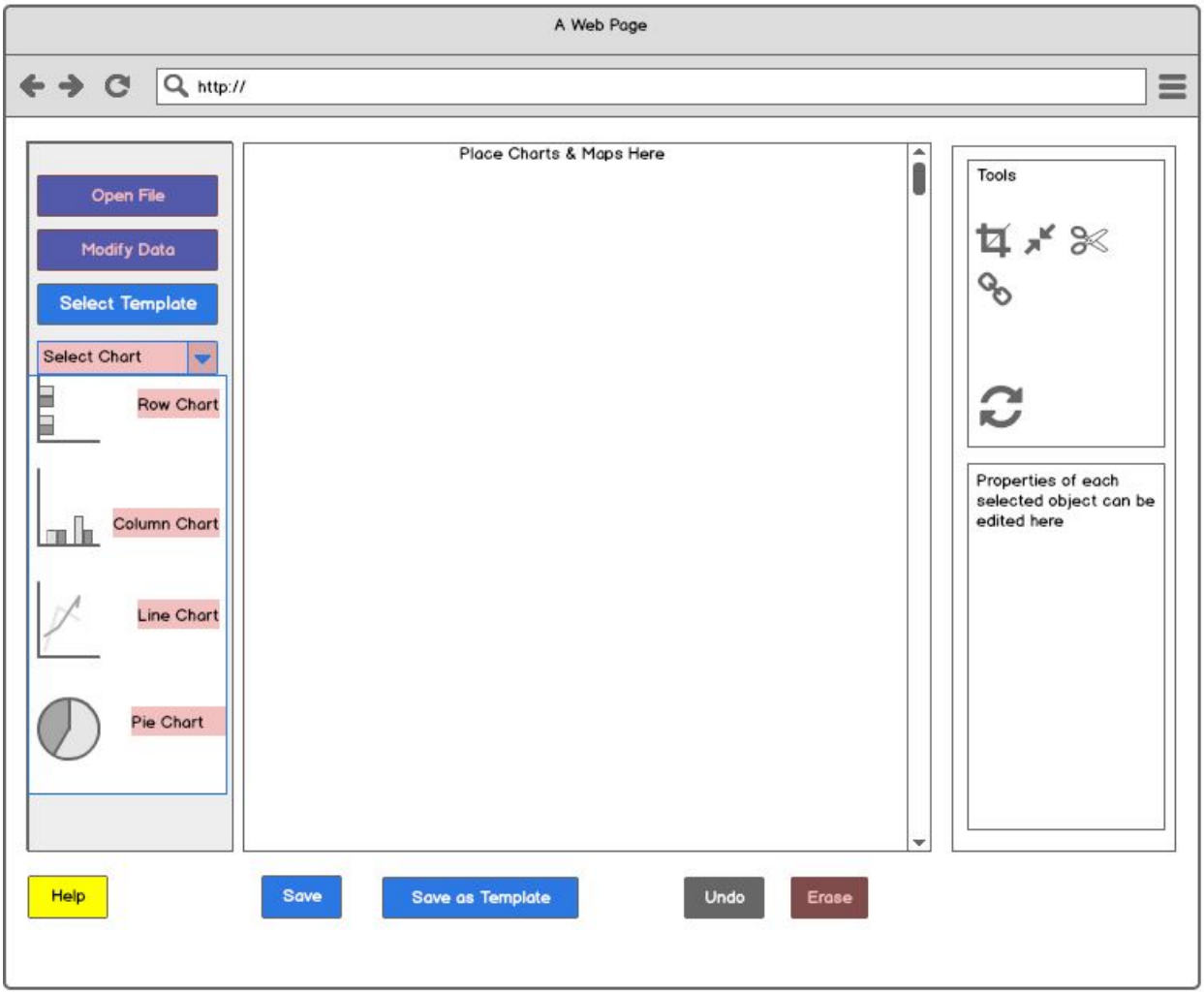

Figure 10: Select Chart drop down box

Subtask: Add Column Chart

In order to start adding charts, the user will click on the "Add Charts" dropdown. The dropdown will present the user with the options to add the following visualizations: Row Chart, Column Chart, Line Chart and Pie Chart. For this task we will be adding a column chart.

Step 1: Select "Column Chart" option from drop down box (Figure 10). A dialogue box will open (Figure 11).

Step 2: Add the chart name, x-axis and y-axis labels.

Step 3: Select the columns to be used for the chart. This feature provides additional control to the user; he/she can filter the data.

Step 4: Click “Done” button. Selections are saved and a column chart is added to the canvas (Figure 12).

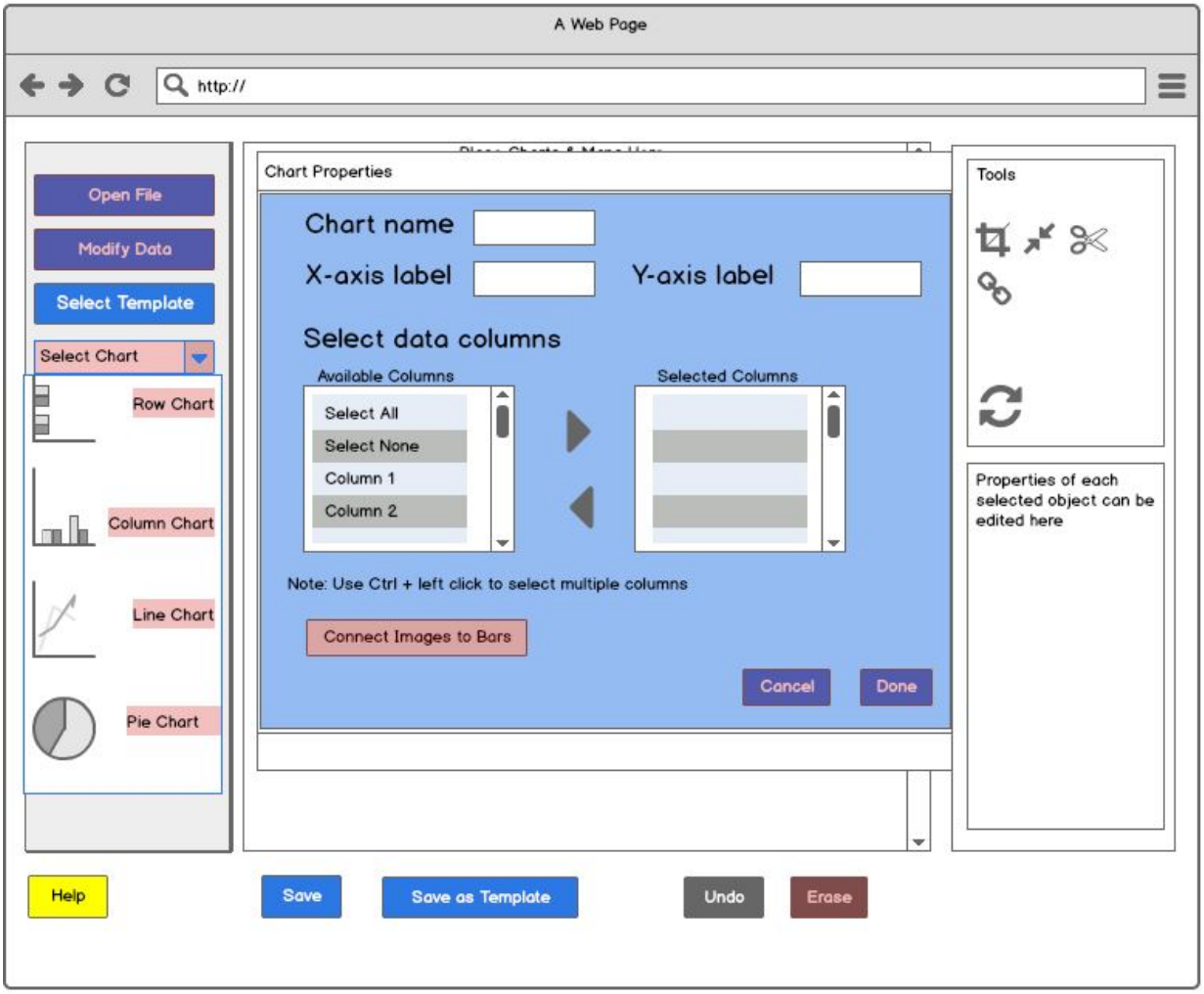

Figure 11: Chart properties dialog for bar charts

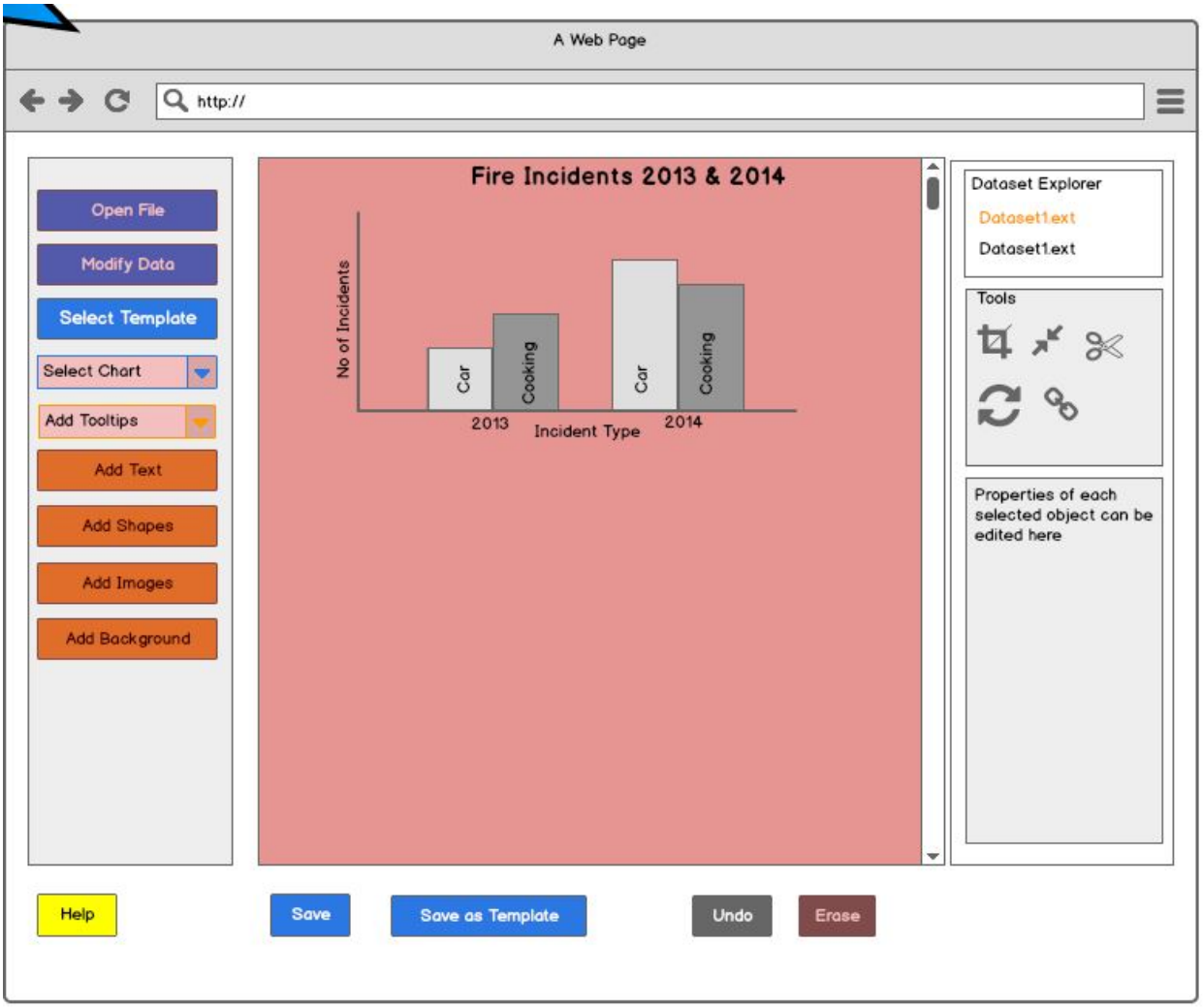

Figure 12: Bar chart added to the canvas

Subtask: Add Image

Step 1: Click "Add Image" button. An image dialog box opens (Figure 13).

Step 2a: Click on recently-used images/saved image thumbnail. This feature eliminates the need to repeatedly upload images.

Step 2b: Click on “Load Image” button. User can upload an image from a hard drive, flash drive, or cloud.

Step 3: Check the checkbox “Use as Background” to set image as background.

Step 4: Click “Done” button. The image is added to the canvas (Figure 14).

[Optional] Click check box to set the image as the background
[Note: Image properties can be changed using the properties window on the main screen.]

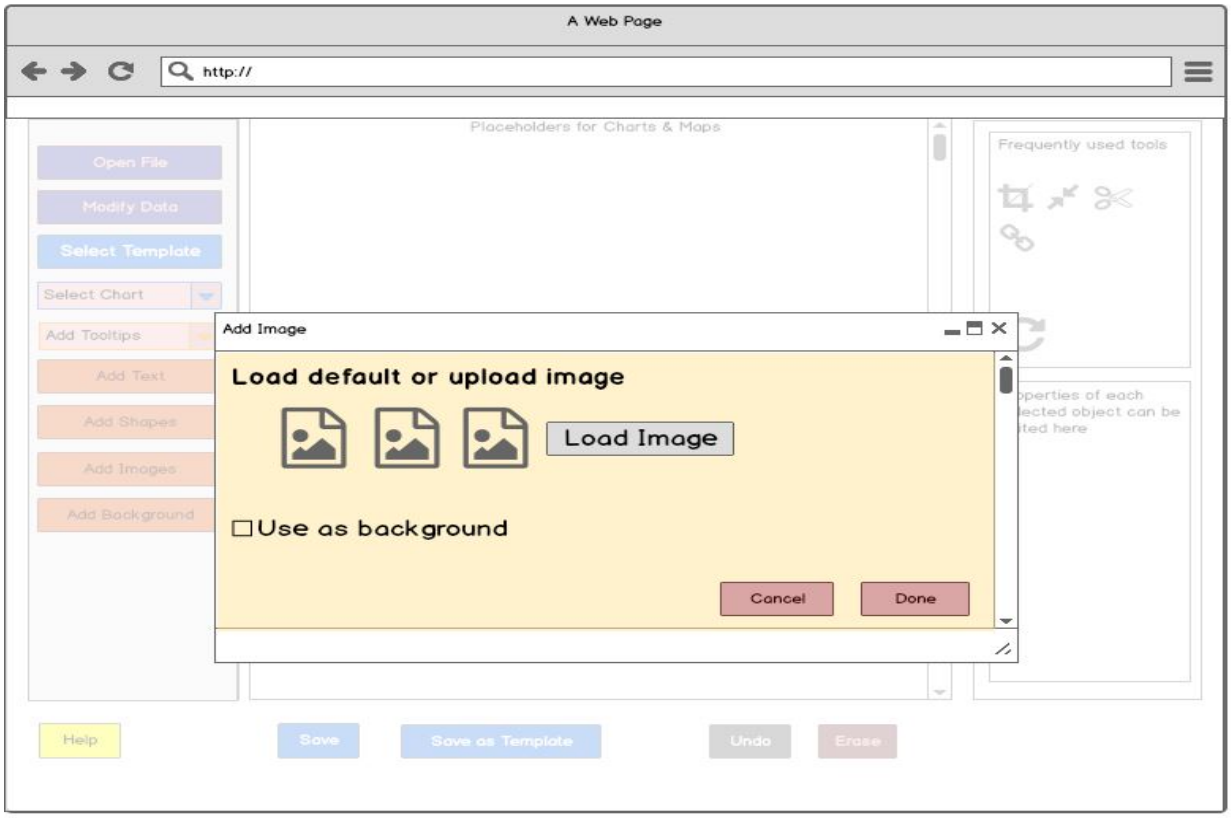

Figure 13: Add Image Dialog

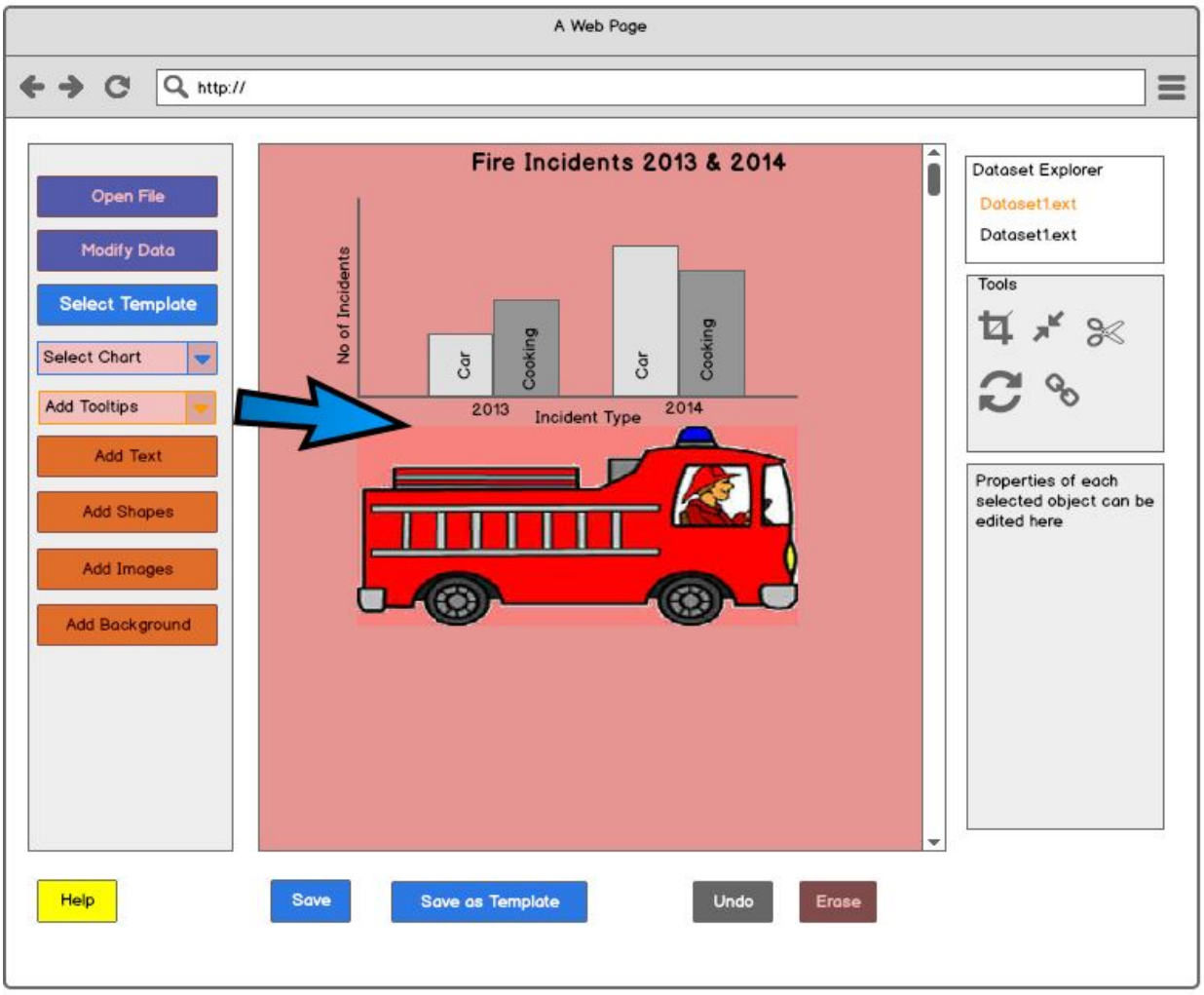

Figure 14: Image added to the canvas

Subtask: Add Pie Chart

Step 1: Click on "Add Chart" drop down box and select "Pie Chart" option.

Step 2: Add the chart name, the x-axis and y-axis labels.
The add pie chart dialog box (Fig. 15) allows the user to name their chart and select the data columns they want in the pie slices.

Step 3: Click on "Done" button. Saves selections and the pie chart onto the canvas. Figure 16 show the pie chart on the canvas.

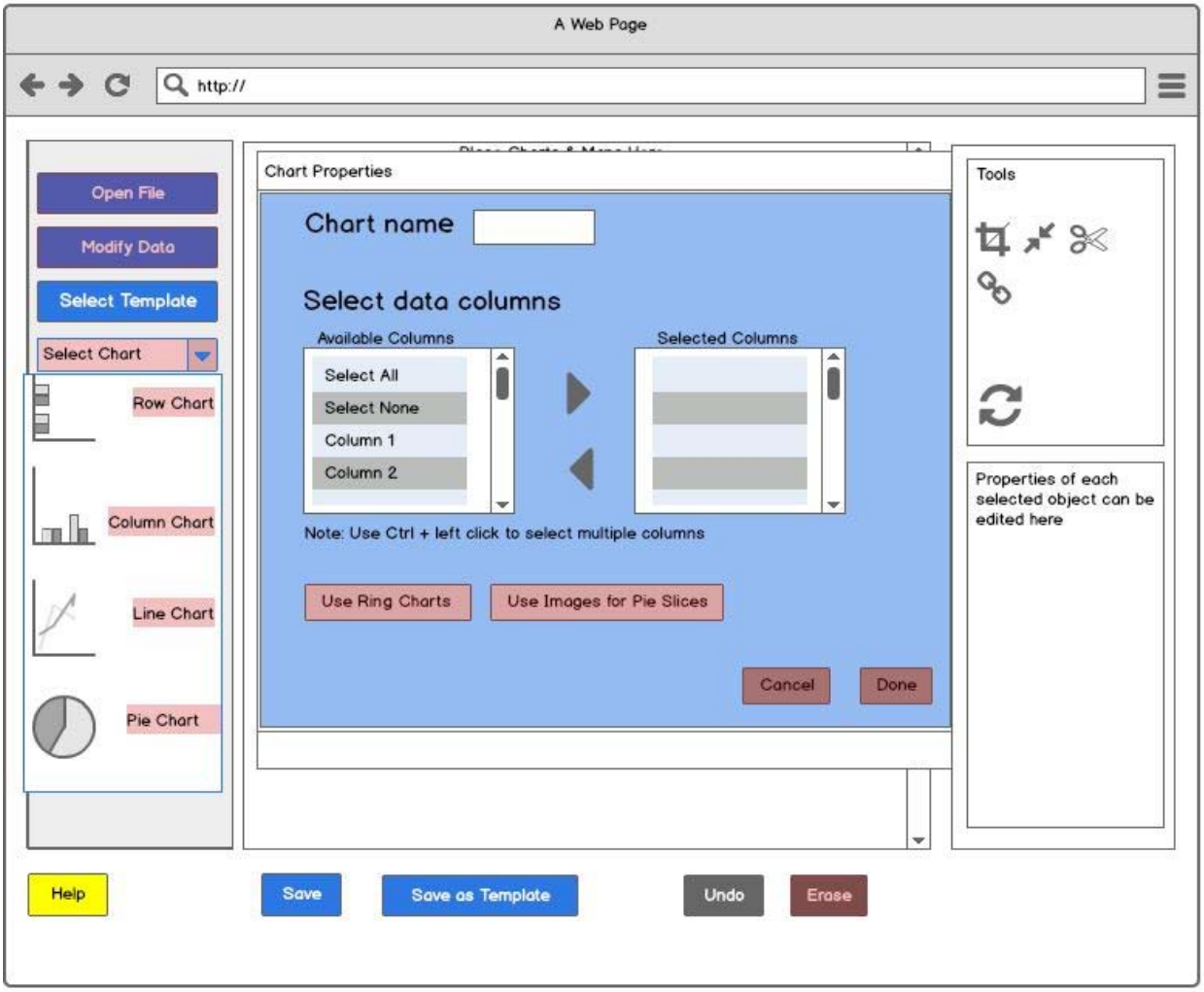

Figure 15: Chart properties Dialog for Pie Chart. [Note: There are two pie charts shown here even though one chart was added (to reduce the number of screens needed). The wizard must be used twice to add two charts.]

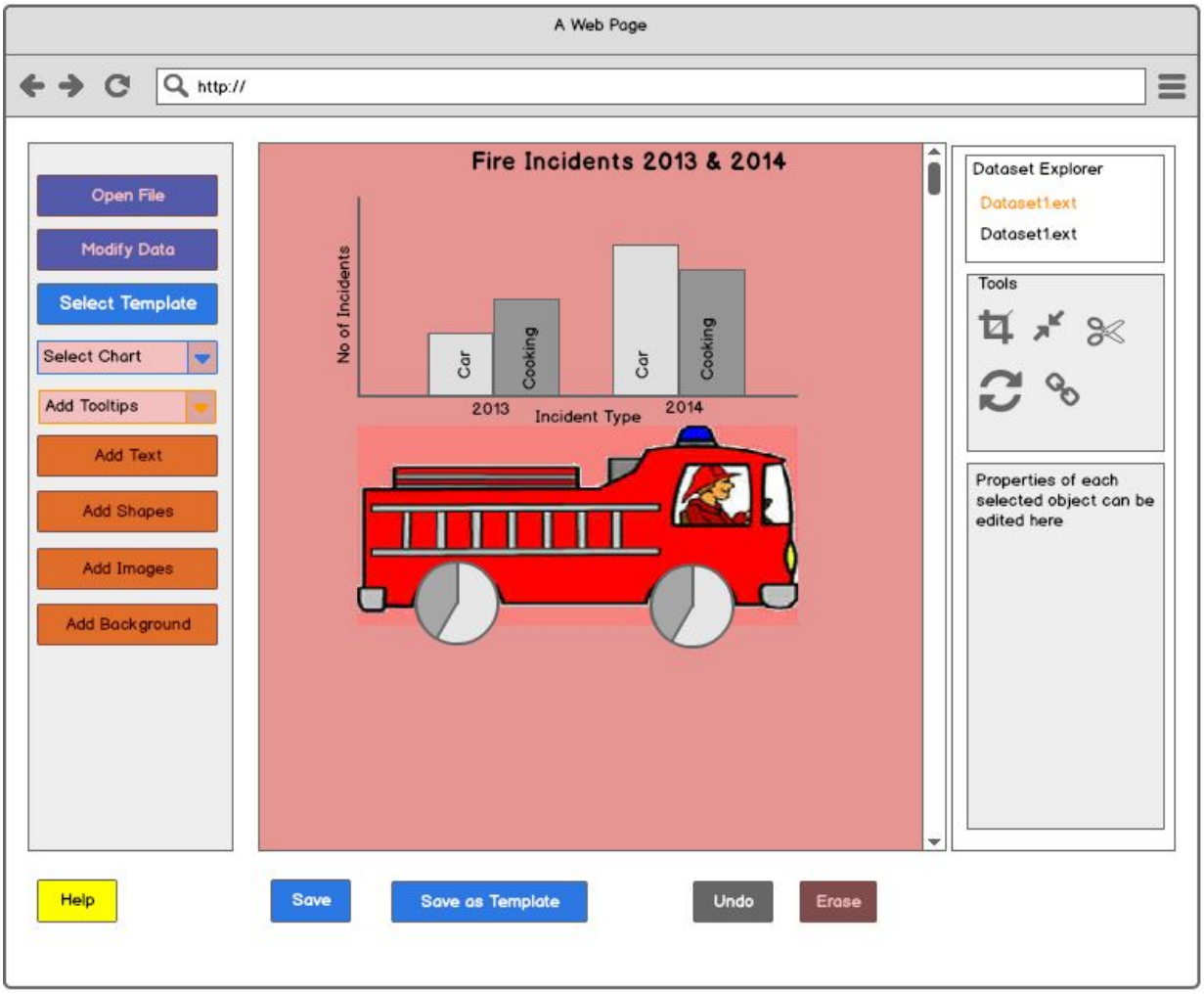

Figure 16: Pie chart overlaid over the image

Subtask: Add Line Chart

Step 1: Click "Add Chart" button and select "Line Chart" option.

Step 2: Set the chart name, x-axis and y-axis labels in dialogue box. Set the chart properties (as described in Add Column Chart and Add Pie Chart subtasks).

Step 3: Click on "Done" button. Saves selections and adds the line chart on to the canvas. Figure 18 shows the line chart on the canvas.

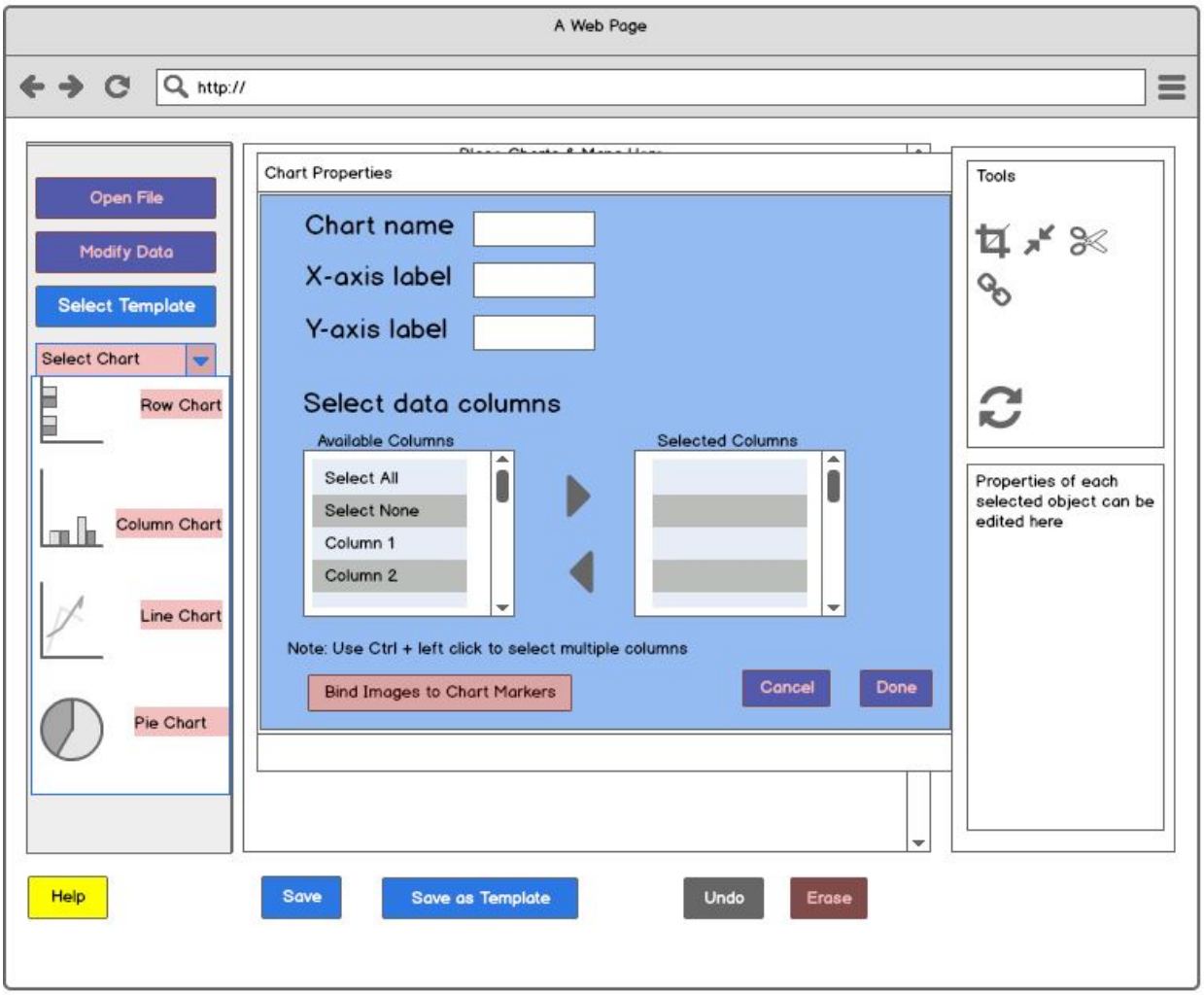

Figure 17: Chart properties dialog for line chart

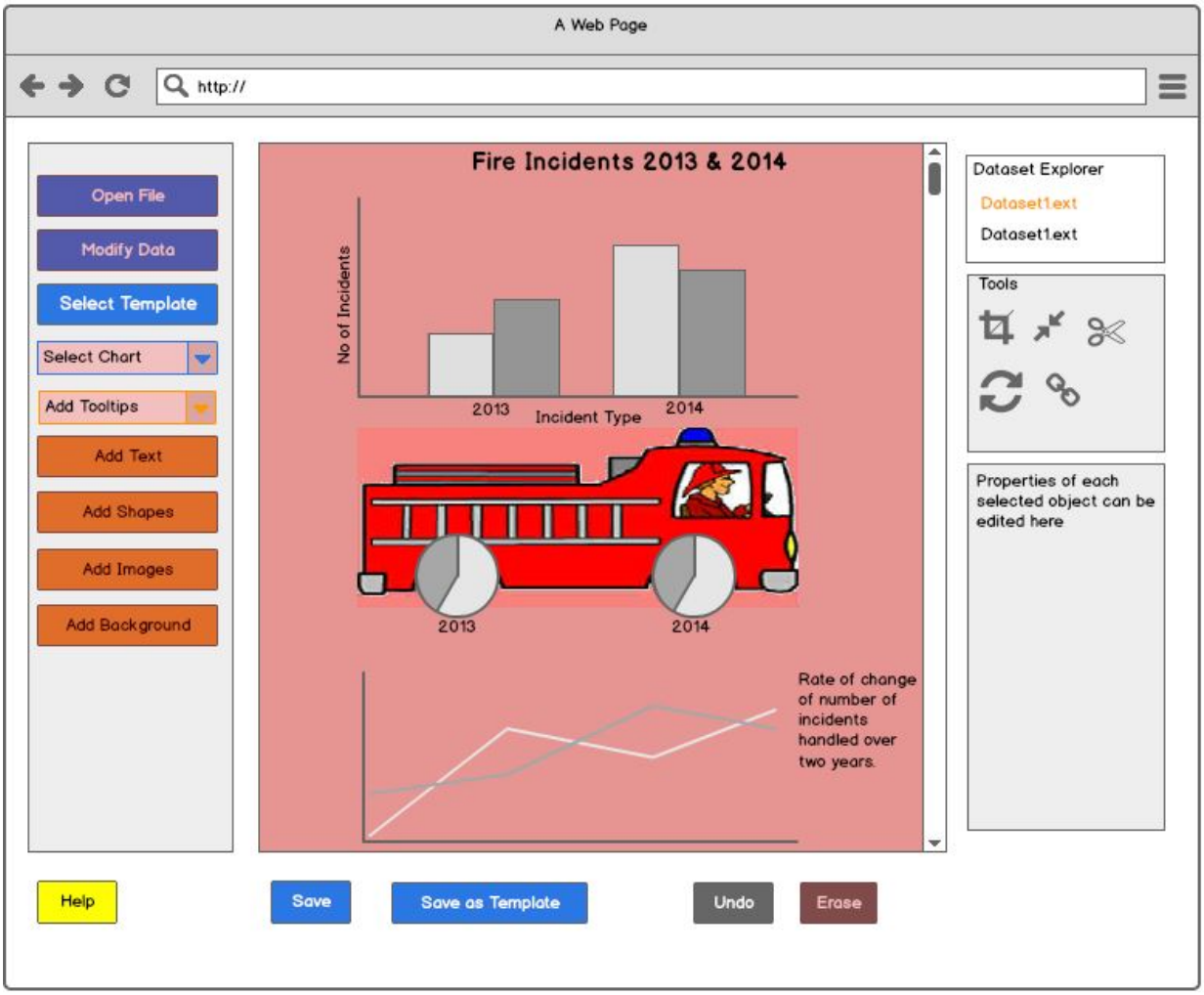

Figure 18: Line chart added to the canvas [Note: Some of the text shown is for demonstration only. Add "Text" button must be used twice.]

Task 3: Add Tooltips

The task involves adding several tooltips that vary in their content. One subtask is adding a tooltip that has formatted string of text, along with a data value associated with a marker on the line chart. Another subtask is adding a tooltip that displays content from a SQL query. The last subtask involves a tooltip that displays a row chart in it.

Subtask: Custom Text Tooltip

The custom text tooltip allows the user to embed tooltip values inside of a string of text. The following steps depict the functionality of this subtask.

"There were (tooltip value) fires in 2014"

Step 1: Click “Add Tooltips” drop down box (Figure 20).

Step 2: Select “Custom Tooltips” option. Shows Custom Tooltips Wizard dialog box.

Step 3: Select “Custom Text” radio button (Figure 21).

Step 4: In the text input box, enter text that will be shown in tooltip(s). Add a numerical value by enclosing it inside of parentheses.

Step 5: Click “Next” button. Shows Tooltip Properties dialog box (Figure 22).

Step 6: Select tooltip direction by clicking on a radio button. The options are shown as images of tooltips.

[Optional] Change tooltip rotation by clicking on a radio button for Rotation. There are no default selections for Rotation. If the user does not select a rotation, then the tooltip direction is used. If the user selects a rotation, then the direction along with the rotation are applied.

Step 7: Select tooltip visibility by clicking on a radio button for Visibility. The options are: always show and show on hover.

Step 8: Click “Next” button. Saves selections and displays tooltip(s) on the appropriate markers on the chosen chart. Figure 23 shows the custom text tooltip on a bar chart.

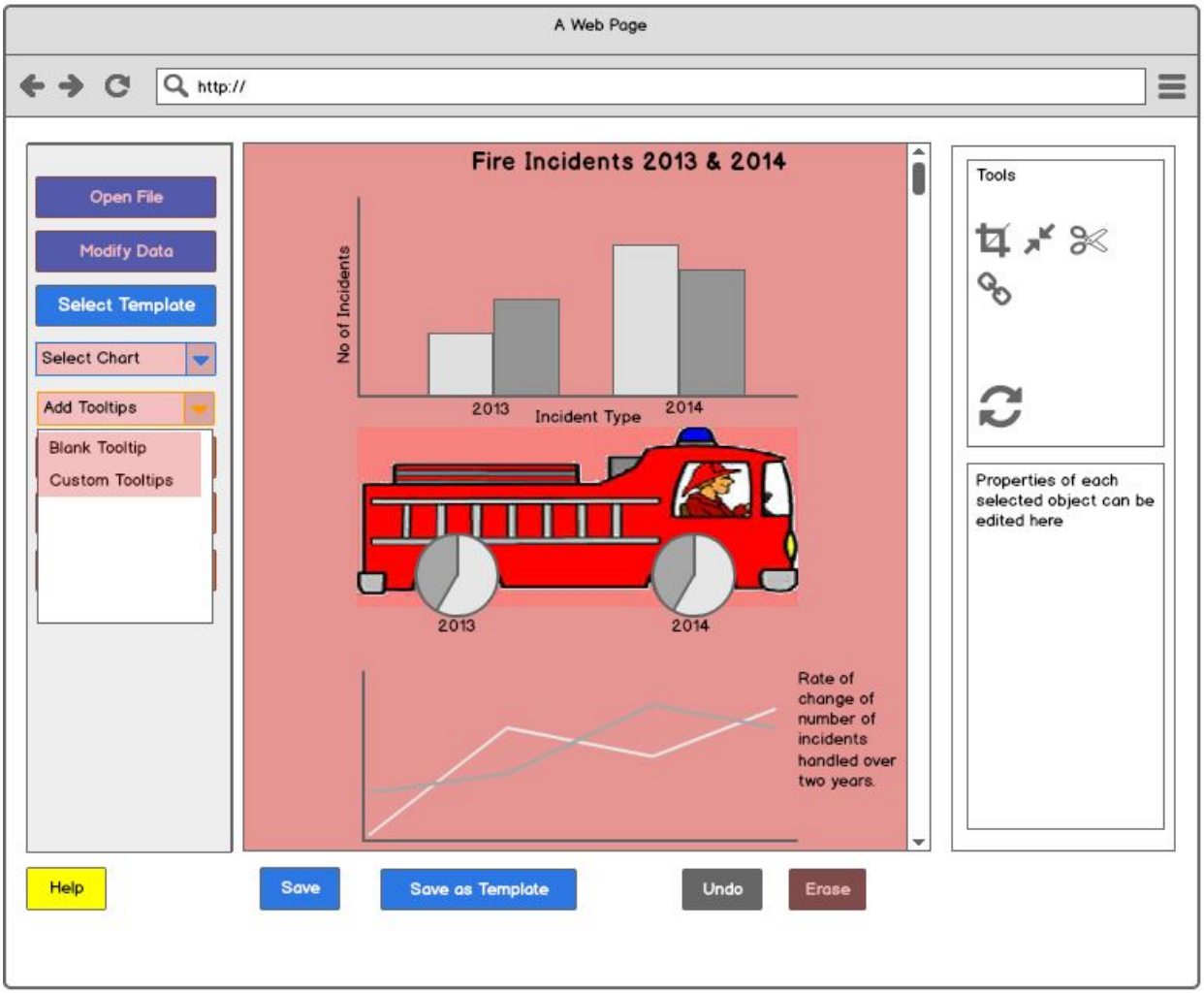

Figure 19: Tooltips drop down box

Subtask: Chart Tooltip

Steps 1-2: Same as indicated in Custom Text Tooltip subtask.

Step 3: Click on “Chart” radio button.

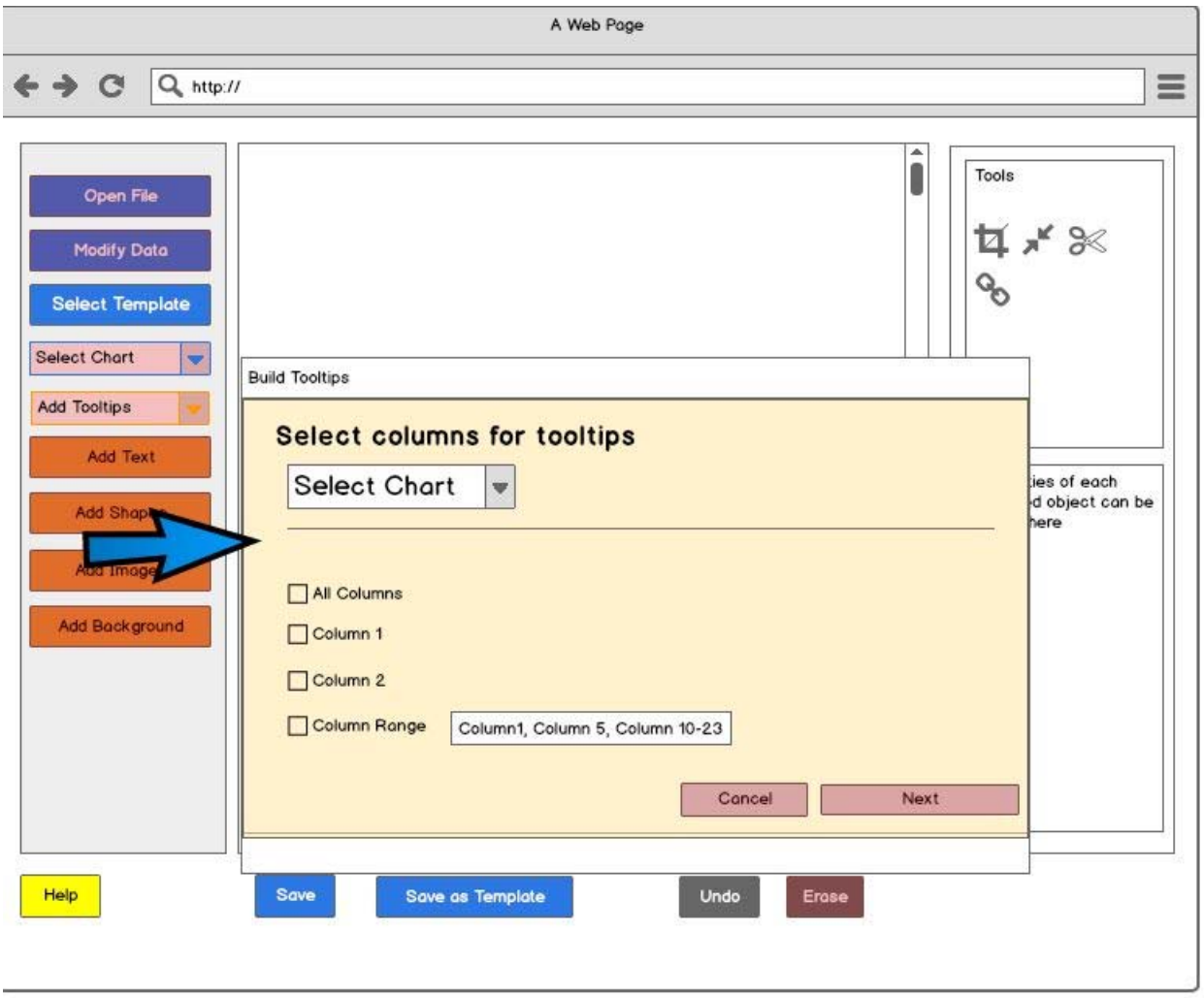

Figure 20: Build tooltips dialog - Select columns for tooltips

Step 4: Click "Select Chart" drop down box.

Step 5: Click "Row Chart" option (Figure 24). Selecting a chart binds it to a tooltip/tooltips. The other chart options are: Column, Line, and Pie charts.

Step 6: Click "Bind Data" button. Opens Bind Data to Tooltip's Chart dialog box (Figure 25).

Step 7: Complete same steps as indicated in Select Data subtask.

Step 8: Click "Done" button. Saves selections and binds selected data to tooltip's chart.

Steps 9-13: Same as indicated in Custom Text Tooltip subtask (steps 5-8). Figure 26 shows a chart tooltip bound to a pie chart on the canvas.

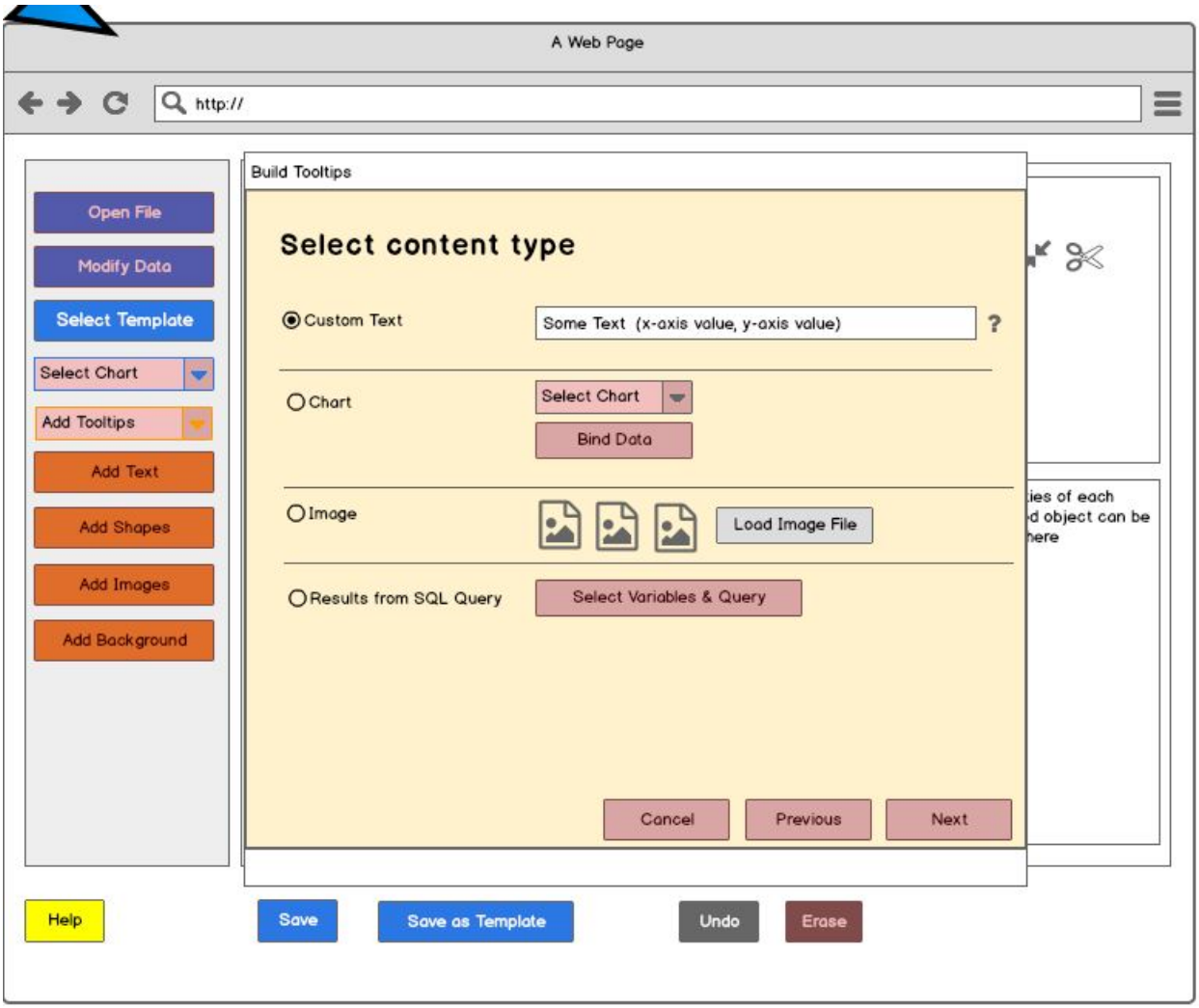

Figure 21: Build tooltips dialog - Select content type

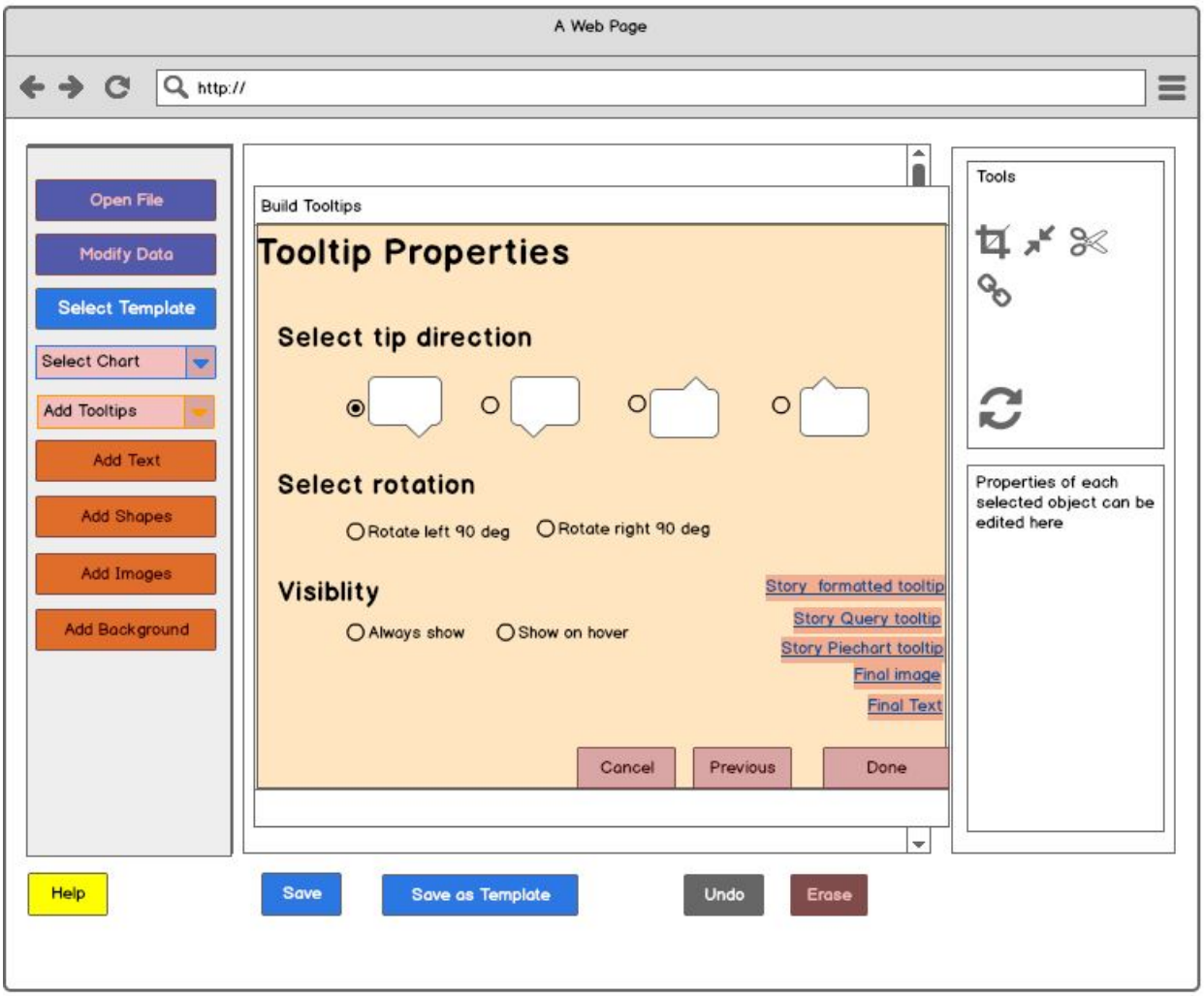

Figure 22: Build tooltips dialog - Tooltip properties [Note: The highlighted links are for demonstration only due to Balsamiq's limited ability to allow conditional transitions.]

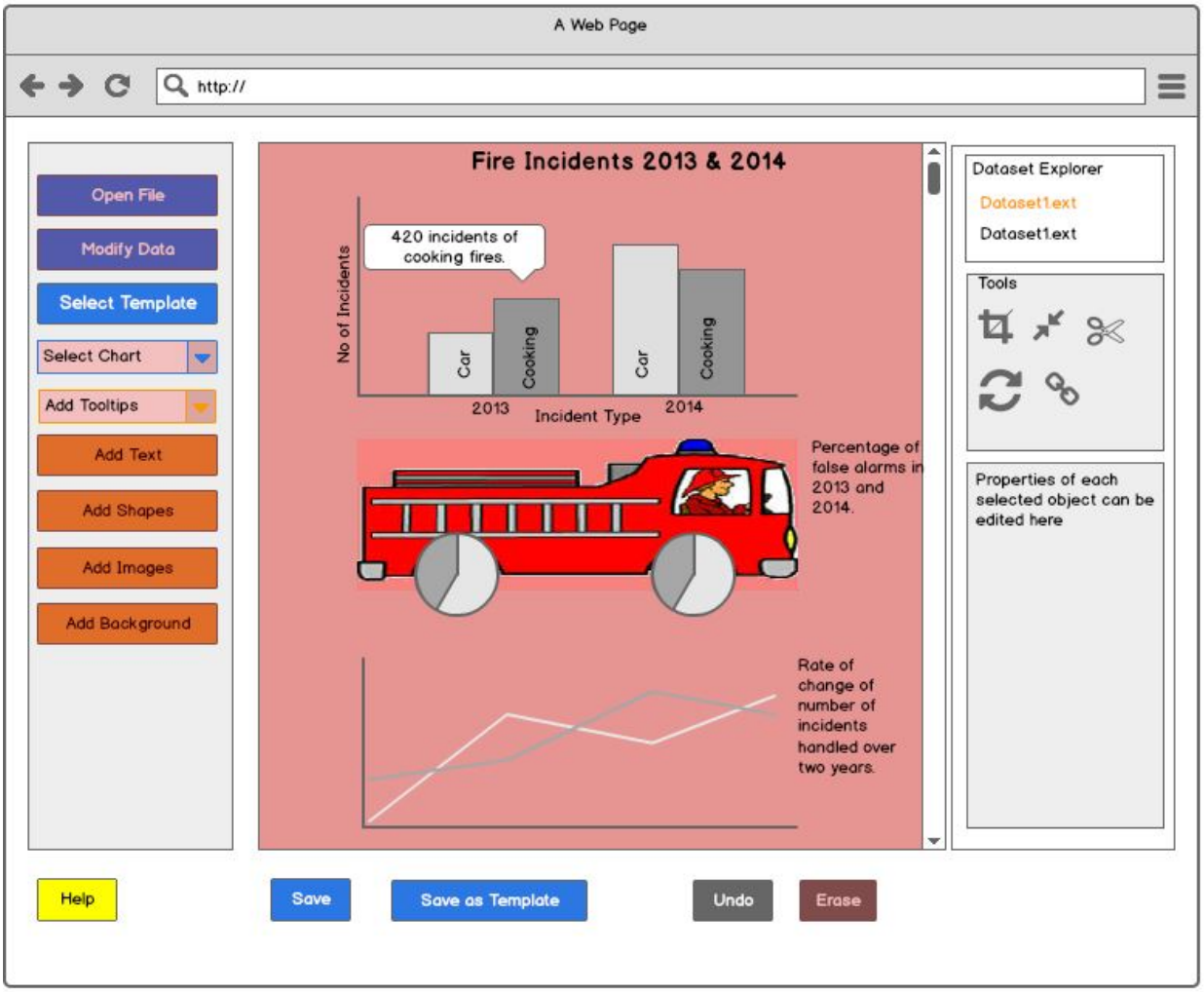

Figure 23: Text tooltip added to the bar chart

In Figure 23, the custom tooltip is shown with the value 420 enclosed in text to provide additional information.

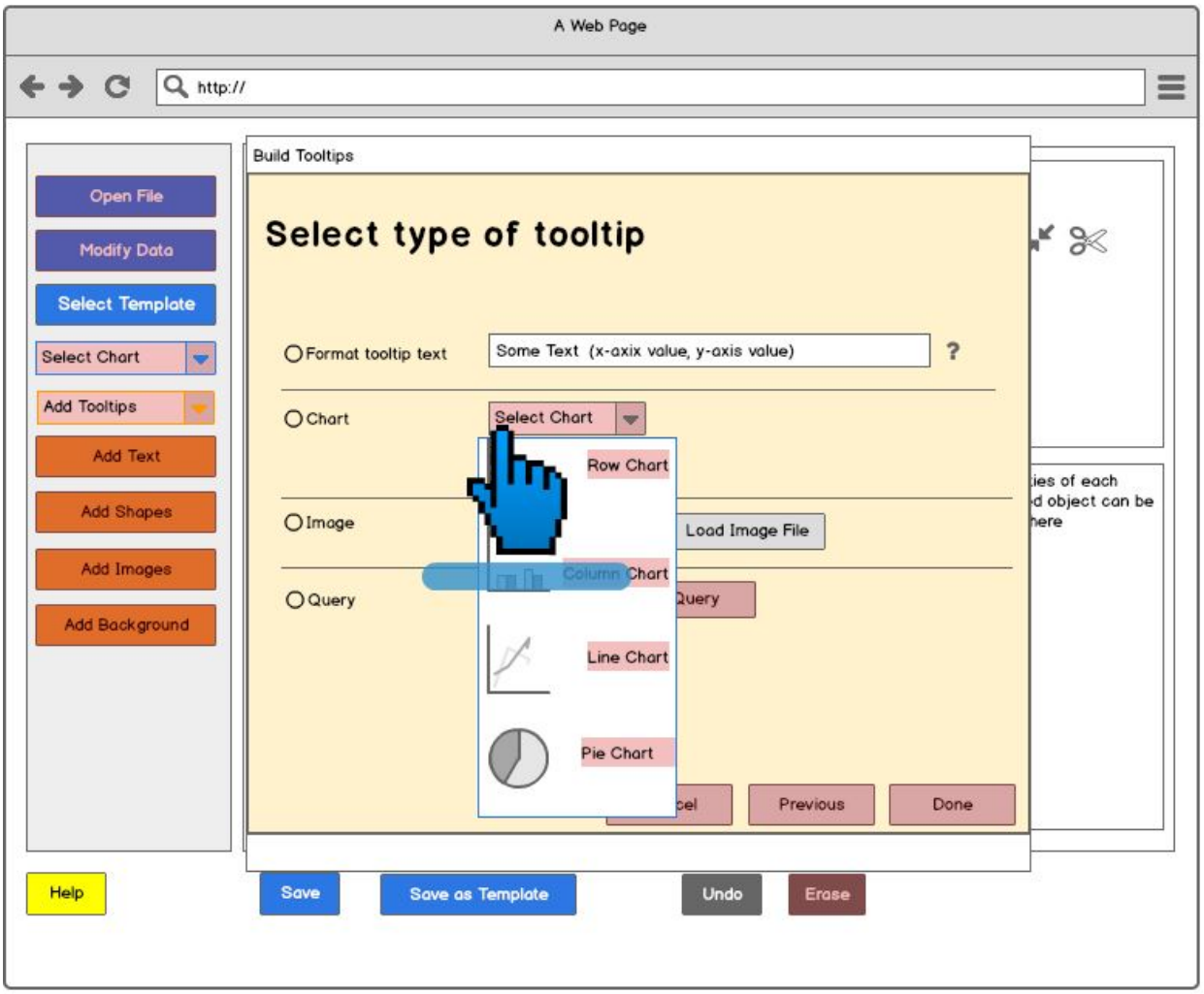

Figure 24: Build tooltips dialog – Select chart to be inserted inside tooltips

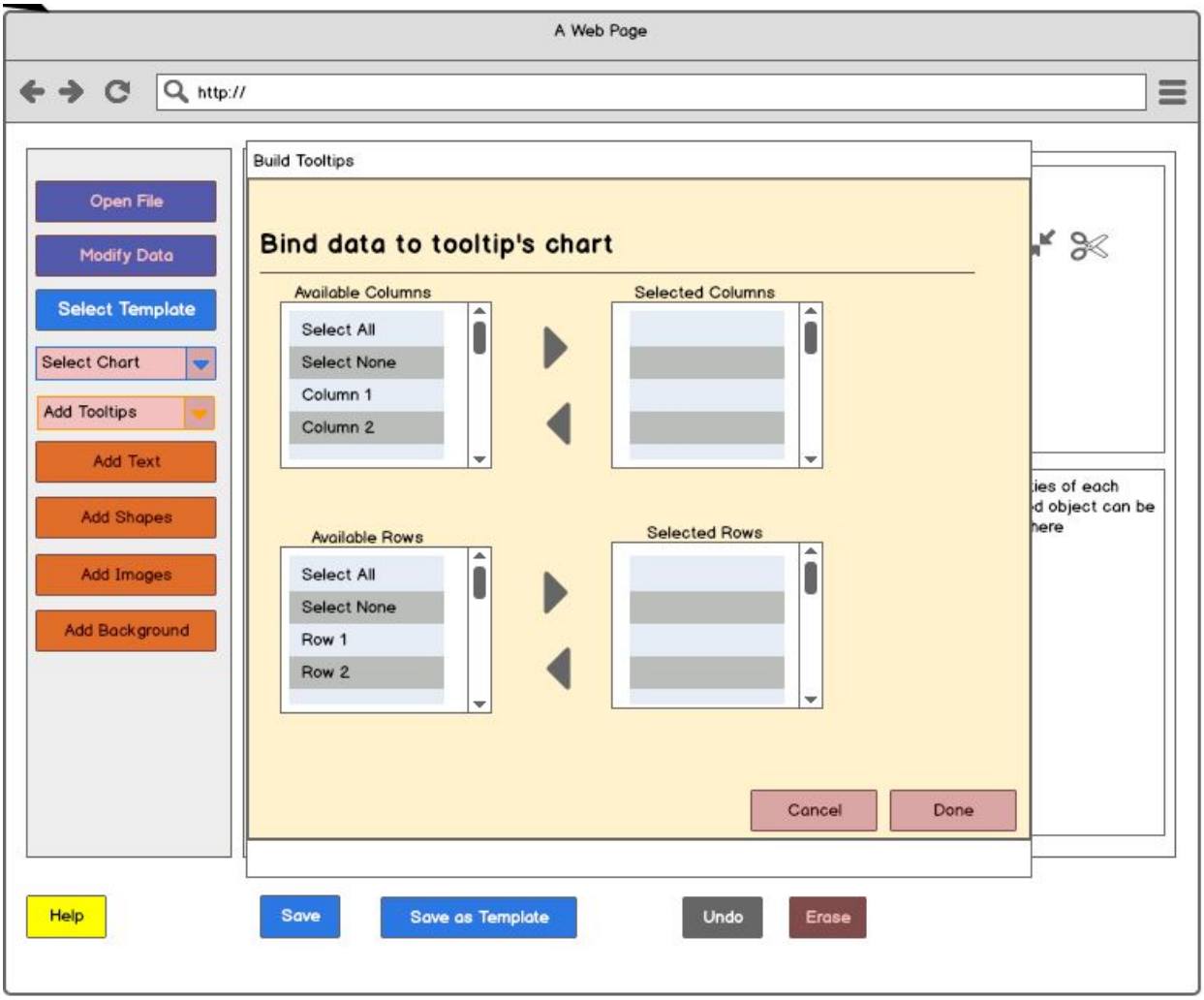

Figure 25: Build tooltips dialog – Bind data to tooltip's chart

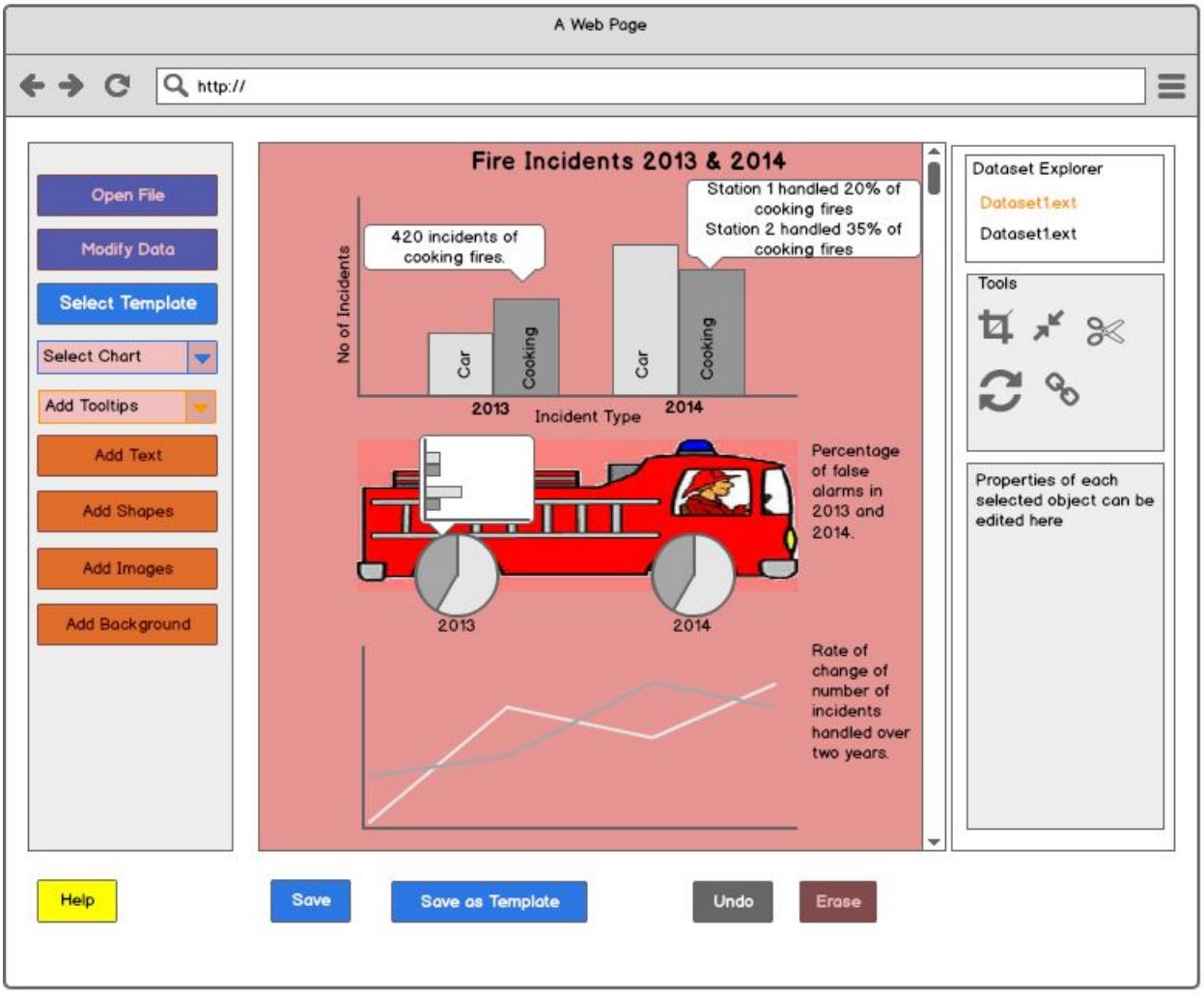

Figure 26: Tooltip with visualization inside it added to the canvas

Subtask: SQL Query Tooltip

In this subtask we will be adding a query tooltip, which allows the user to use a SQL-type of query. The results from the query are enclosed in formatted text, which is provided by the user.

Steps 1-2: Same as indicated in Chart Tooltip subtask.

Step 3: Click "Results from SQL query" radio button.

Step 4: Click "Select Variables & Query" button. Shows Select Query dialog box (Figure 27).

Step 5: Write SQL query in "Write Query" text input box. The variables (columns) that are available to use include in the query are shown in the "Selected Variables" list box.

Step 6: In the "Format Query" text input box, write a string, which will be used to format the text provided by the user and the result from the SQL query. Result variables are displayed in quotations. This formatted string along with the query result will be displayed in the tooltip.

Step 7: Click "Done" button. Returns to the Select Content Type dialog box.

Steps 8-12: Same as indicated in Custom Text Tooltip subtask (steps 5-8). Figure 28 shows a SQL query tooltip bound to a bar chart on the canvas.

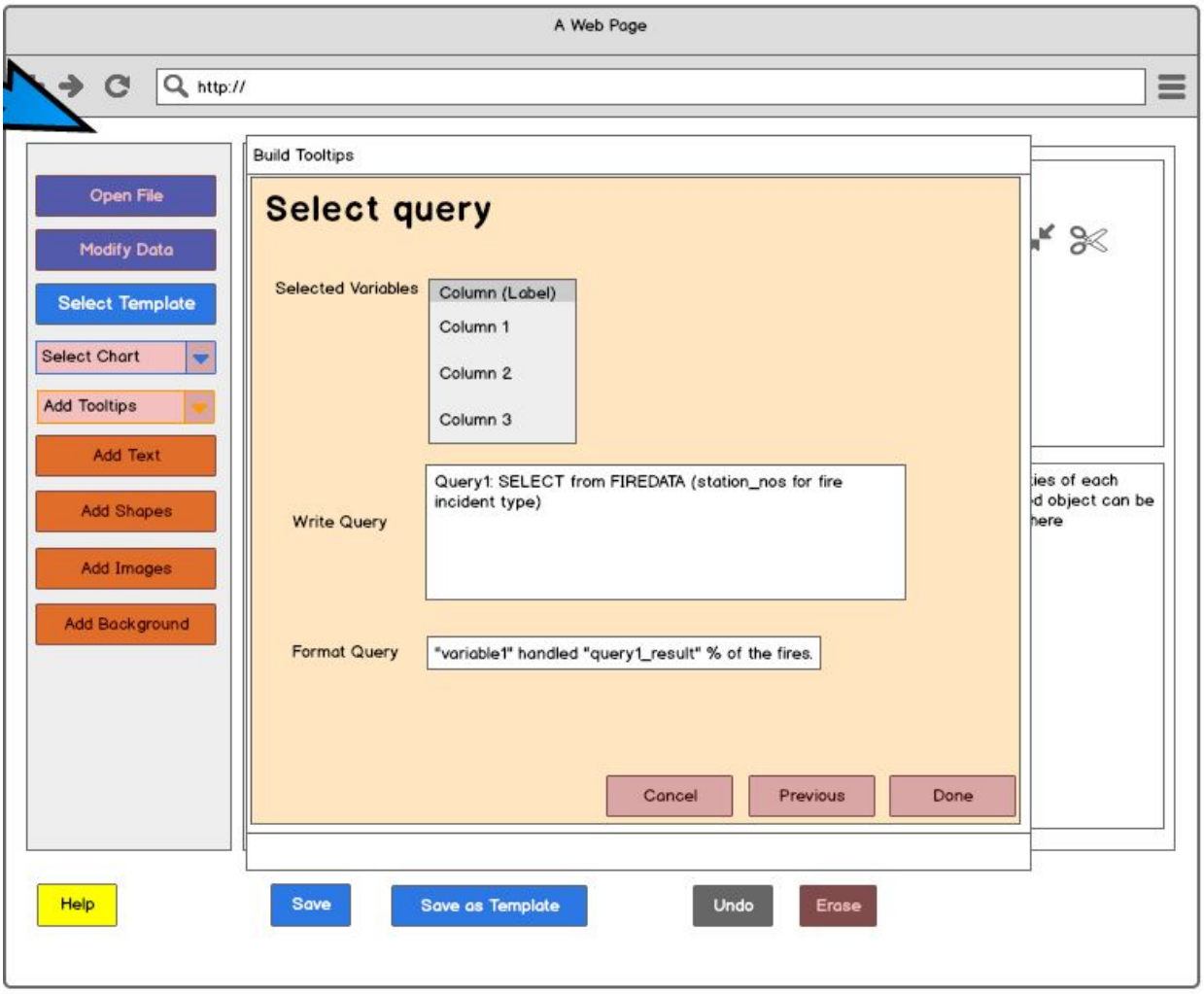

Figure 27: Build Tooltips dialog – Select Query

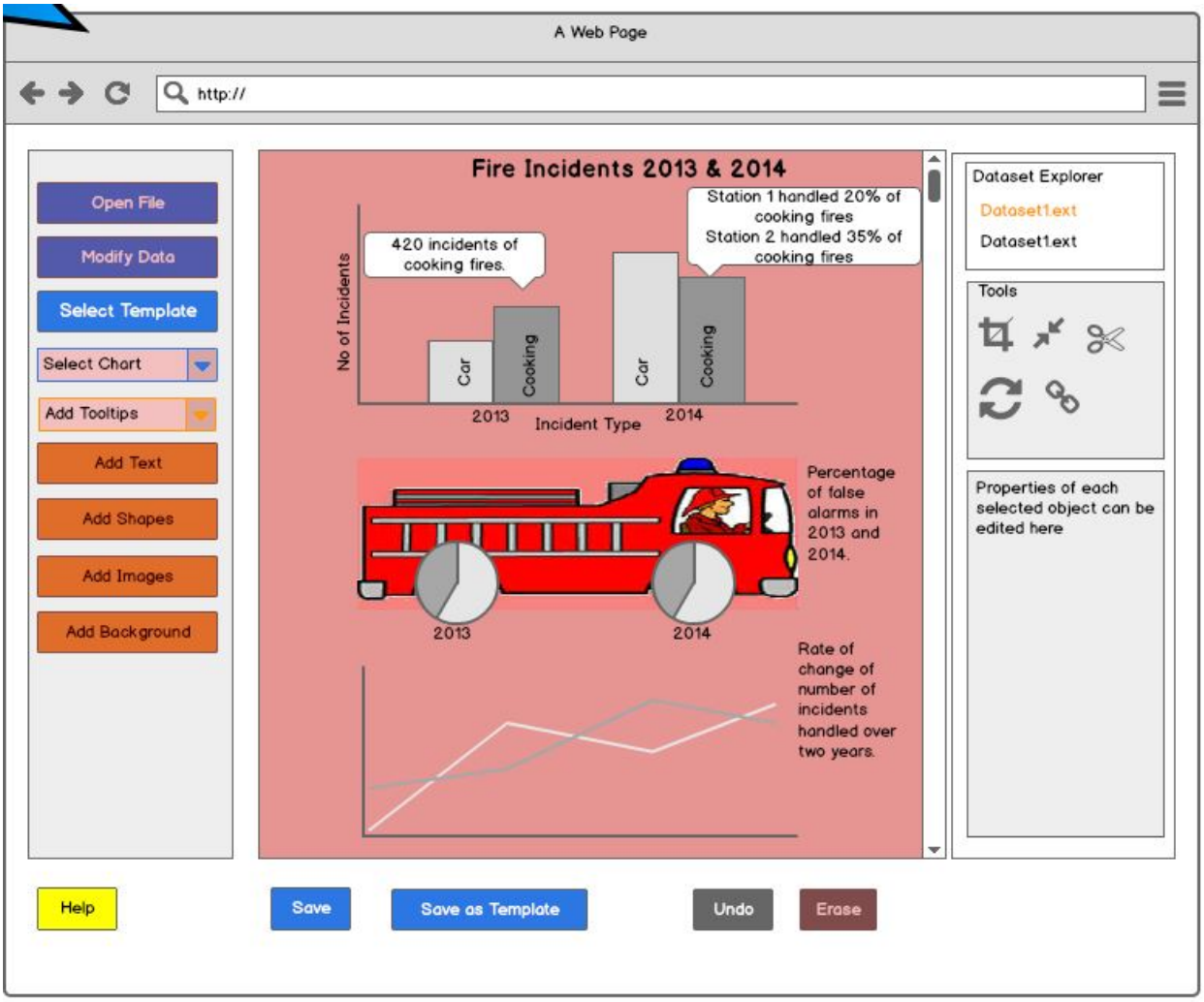

Figure 28: Query Tooltip added to the canvas

Subtask: Connect Images to Line Chart Markers

Step 1: Click on the line chart shown on the canvas. The properties for the line chart are show in the Properties window (Figure 29). A link to add images to a chart is shown in the Properties window. Other options can be displayed there.

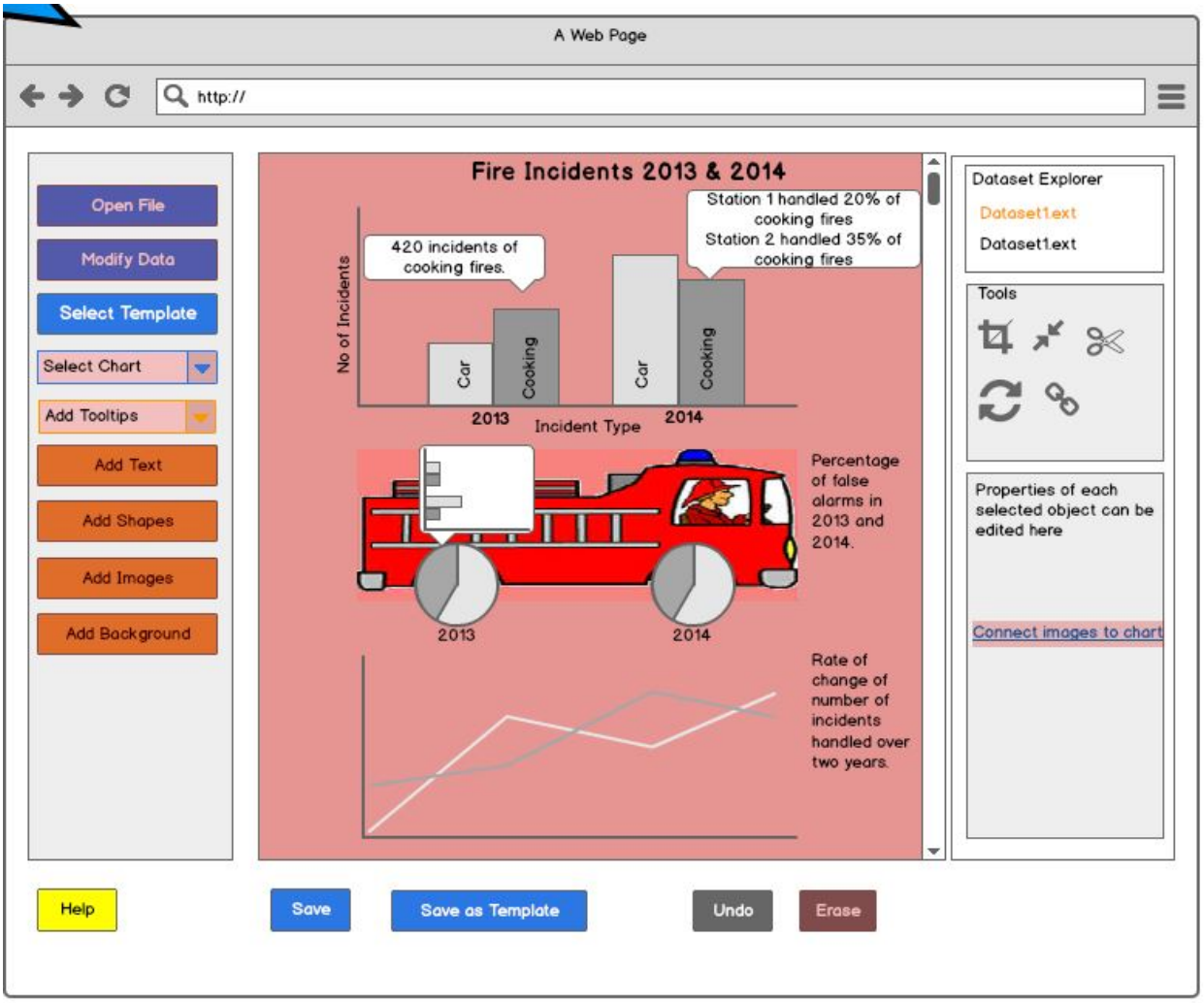

Figure 29: Connect Images to Chart link appears in properties window on clicking on the Line Chart

Step 2: Click on "Connect images to chart" link. Shows Connect Image dialog box (Figure 30).

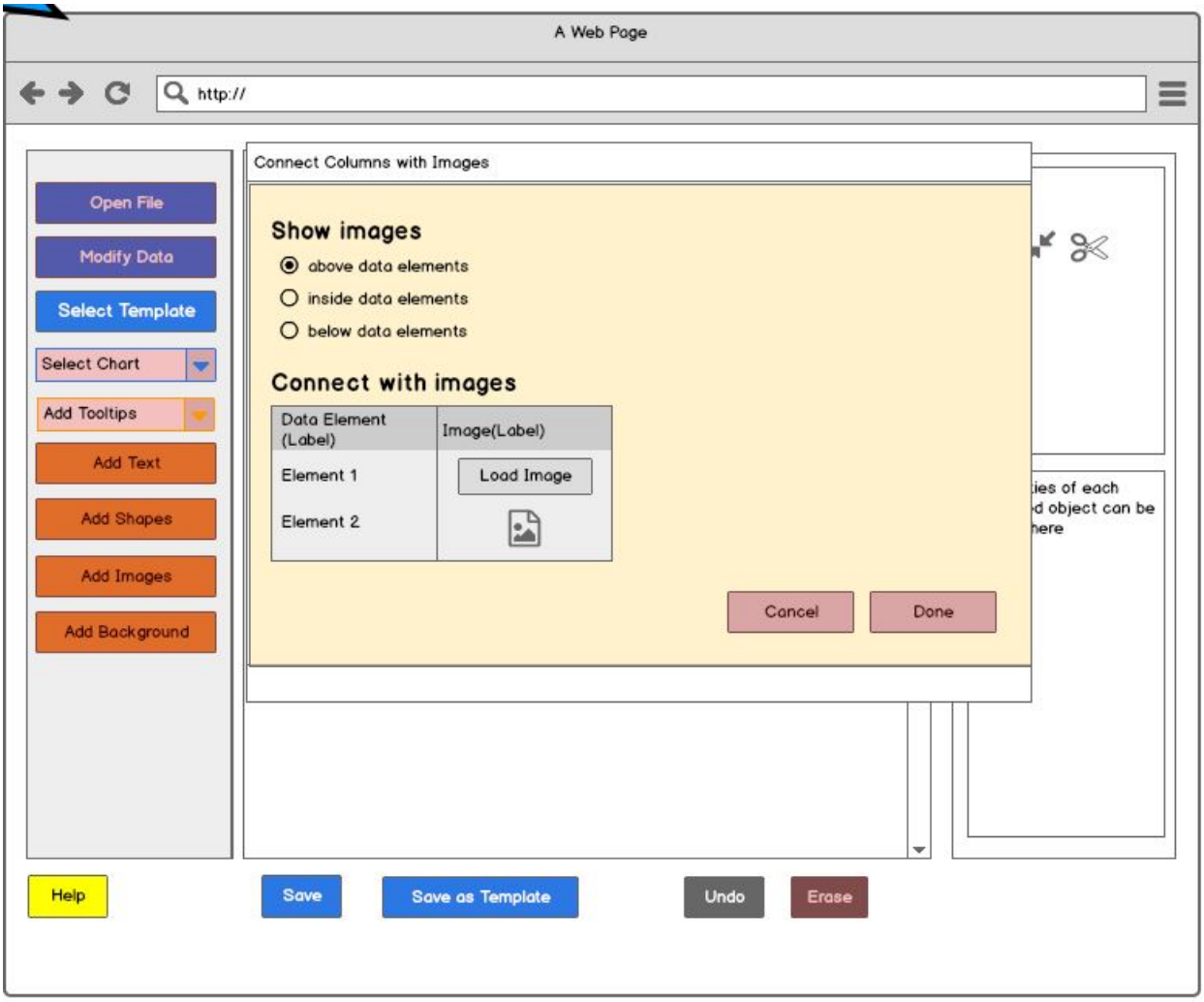

Figure 30: Connect columns with Images dialog

Step 3: Click on radio button option under "Show Image" to select the location of the image with respect to the visualization elements (i.e., bars, line chart markers, or slices). The options are: above data element, inside data element, and below data element. "Inside data element" is not available for line charts and is not shown if a line chart is selected.

Step 4: Click "Load Image" button. User can upload image from hard drive, flash drive, or cloud. A thumbnail of the uploaded image is show in the table.

Step 5: Click "Done" button. Selections are saved and images are shown as bound and connected to the line chart on the canvas (Figure 31.) [Note: The position of the connected images can also be controlled individually via the Properties window.]

[Note: Images can be connected to any type of chart. The ability to connect images to a chart is also available via the Add <chart type> Chart dialog boxes. Figure 11 shows the "Connect Images to Bars" button. Once a user clicks this button, the appropriate dialog box opens to connect images to a chart.]

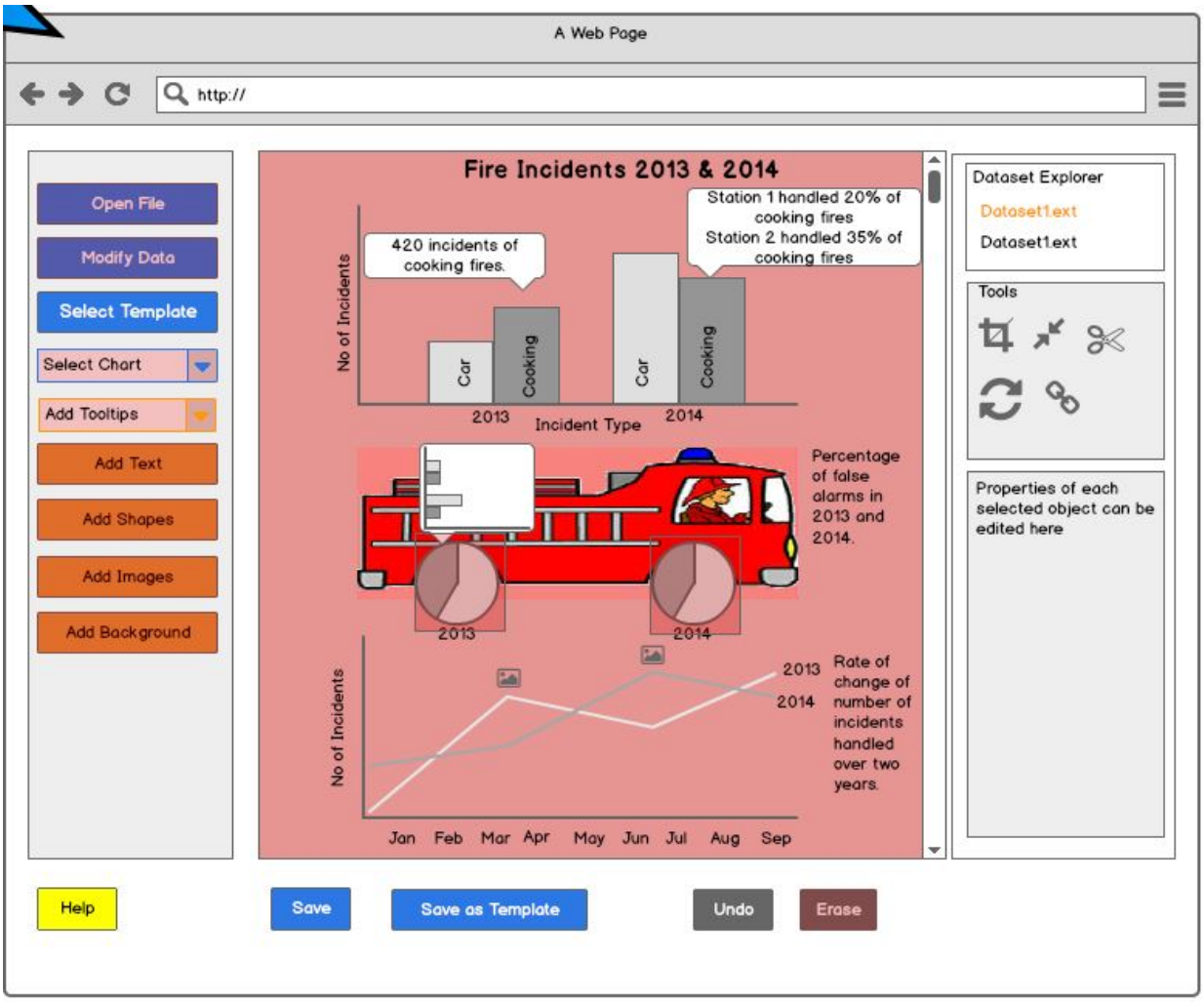

Figure 31: Images appear on different data points on the line chart

Task 4: Change Infographics' Properties
Subtask: Replace Pie Chart with Images for Slices

Step 1: Click pie chart to select it. The properties for a pie chart are shown in the Properties window Figure 32). The prototype shows two options with buttons: "Use Ring Charts" and "Replace Slices with Images."

Step 2: Click "Replace Slices with Images" button. Shows a dialog box that gives options to select images (Figure 33).

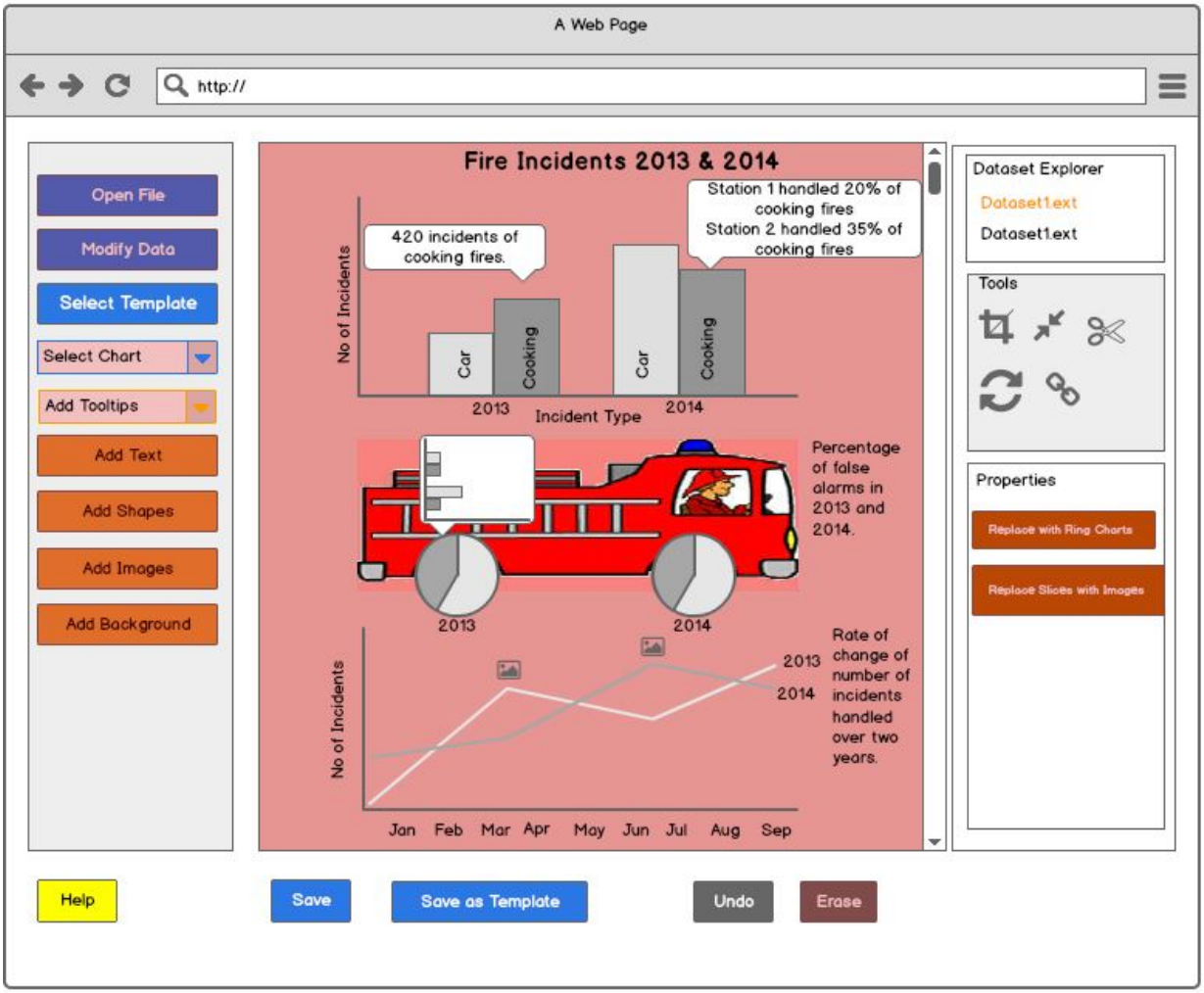

Figure 32: Pie chart properties appear in the properties window after clicking on the pie chart

Step 3: Click "Load Image" to select an image to replace pie slice.

In the table under “Pair each slice with image,” the system will generate a row for each pie slice. An image will be loaded to replace the corresponding pie slice.

Step 4: Click “Select Chart” drop down box. This drop down box shows the titles associated with the pie charts on the canvas. A user selects the appropriate title to indicate which pie chart will be replaced. The default selected item is the first pie chart shown on the canvas (going from top/left to bottom/right). If a user does not click on the drop down box or does not change the selected item in the drop down box, then default pie chart is replaced.

[Optional] Click “Select Chart” drop down box. Shows a list of titles associated with pie charts on the canvas. The default selection is the left/top-most pie chart shown. If a user does not change the default, then the system will use replace the pie slices on the default-selected pie chart.

[Optional] Click “Show percentages” slide control to show or hide percentages associated with pie slices. [Limitation: Prototype does not give user the option to choose location of percentages. This option/property could be displayed on this screen and/or the properties window.]

Step 4: Click “Done” button. Saves changes and replaces the pie slices with the loaded images. Figure 34 shows pie slices replaced with images on the canvas.

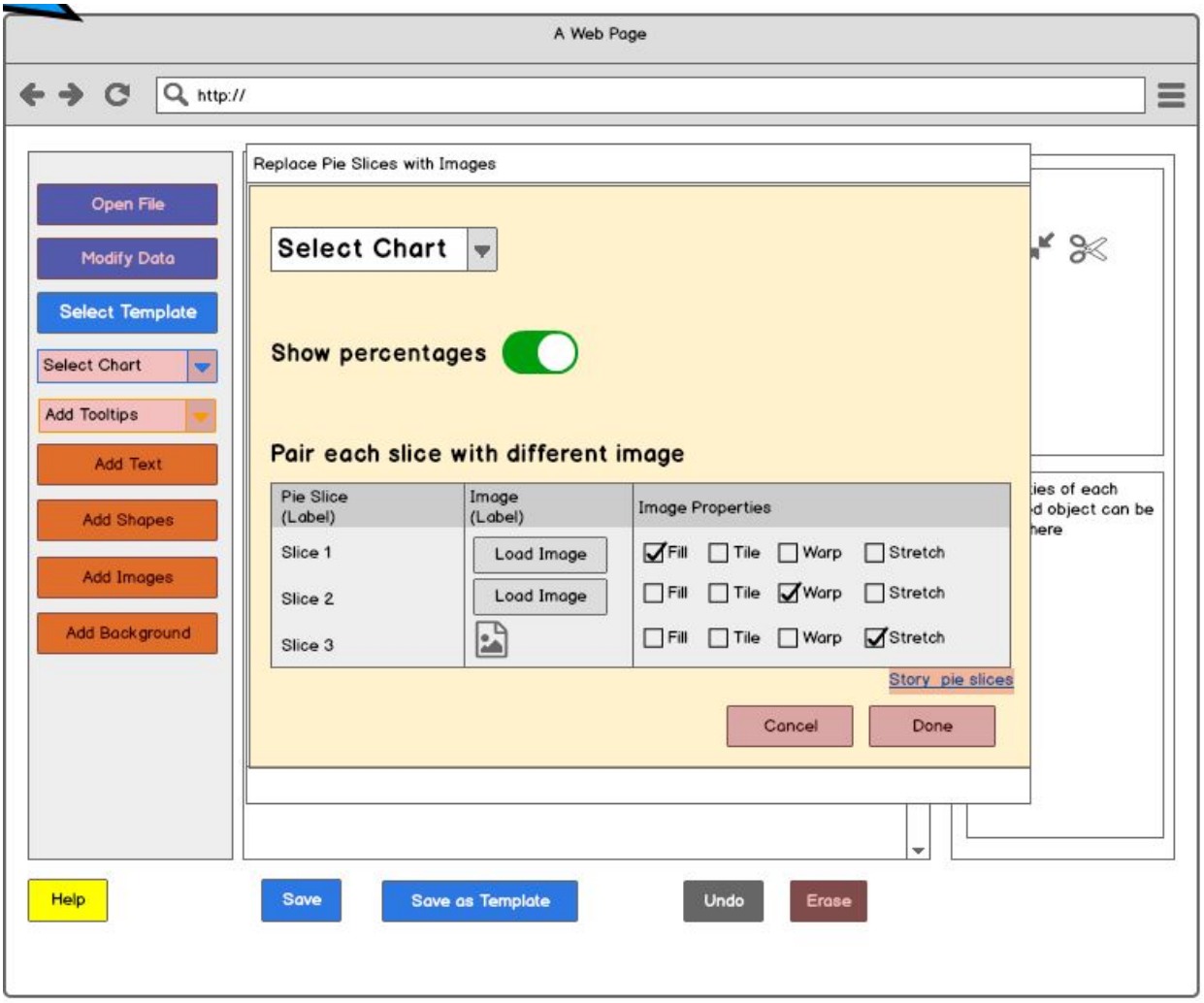

Figure 33: Dialog for selecting properties of images that replace pie slices

Subtask: Formatted Text Tooltip properties

Step 1: Click/select the Custom Text tooltip (top-left) on the canvas.

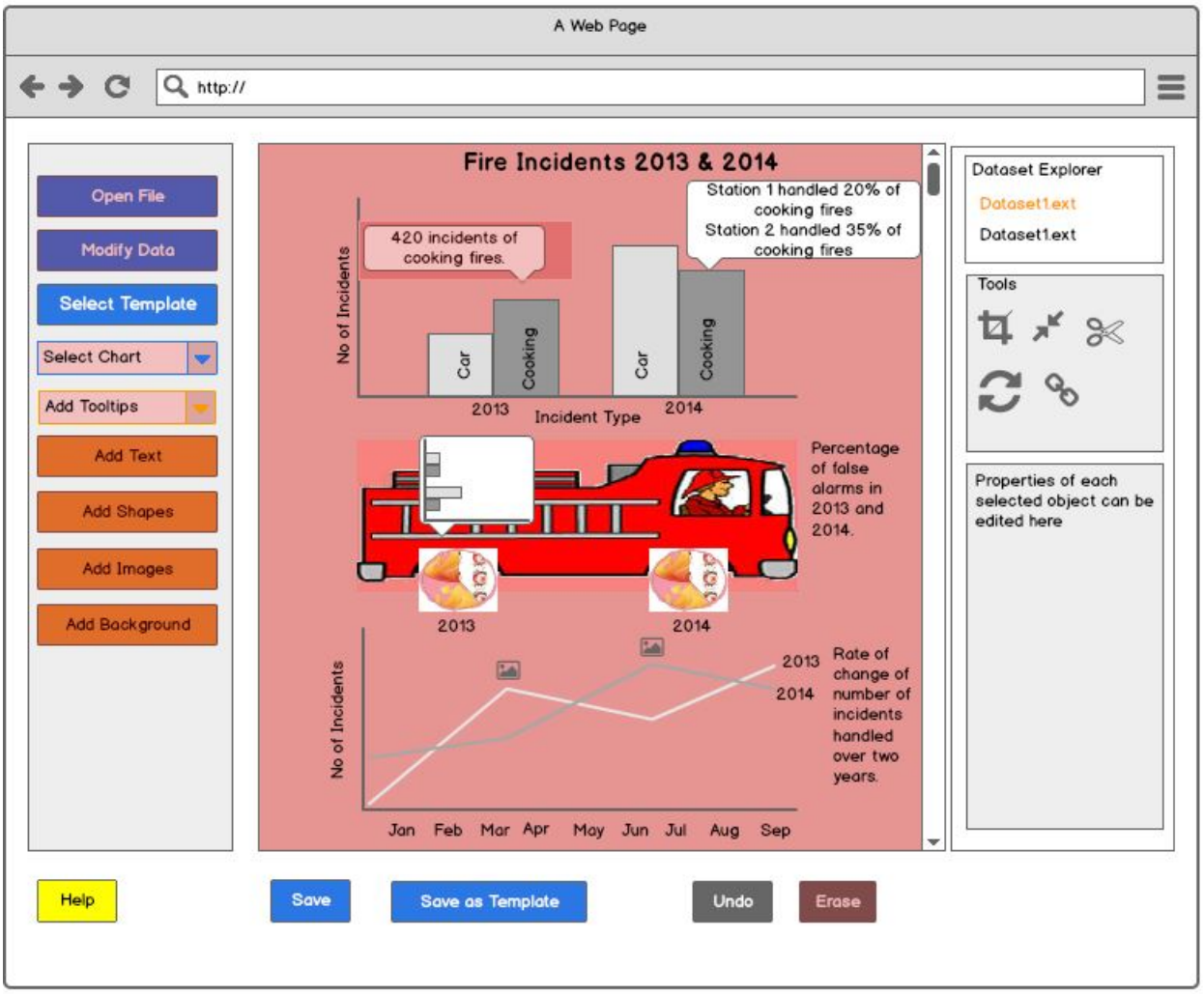

Figure 34: Click on the text tooltip to see its properties

Step 2: Properties window displays tooltip properties that can be changed (Figure 35).

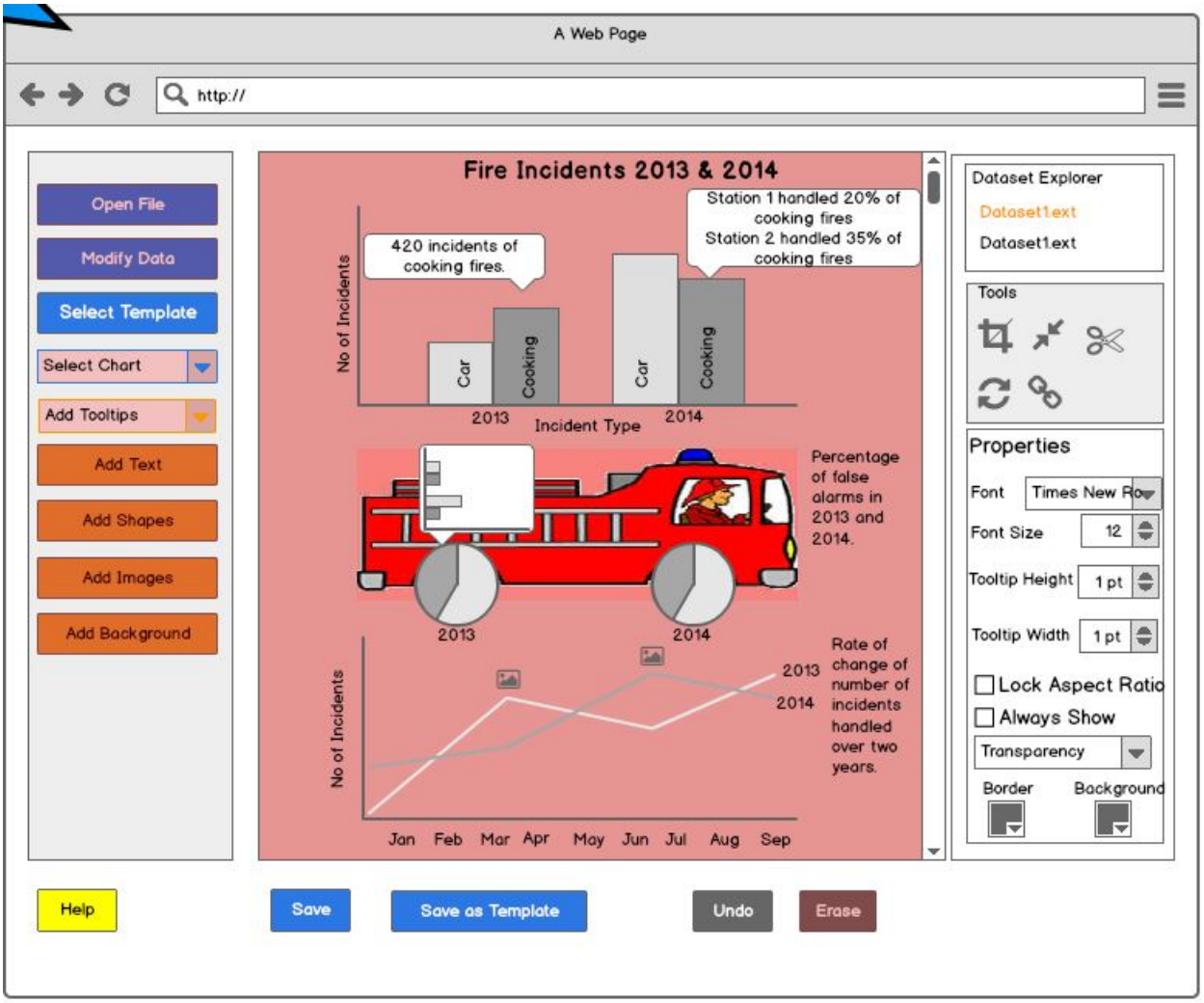

Figure 35: Properties Window shows tooltip properties