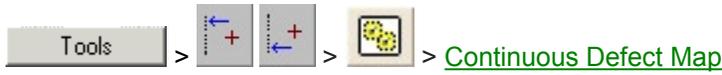Documentation Writing Sample
from Sentry 9000 Software Reference Manual, AccuSentry, Inc.

Continuous Defect Map Tool

Tools > > > Continuous Defect Map

The **Continuous Defect Map** tool creates and displays a defect map showing defect information collected from referenced inspection tools on each inspection cycle. During inspection processing, Defect Map data is gathered from any combination of the following tools:

- Simple Clustering

- Advanced Clustering

- Line Fit

- Spot Check

The data are categorized and represented by different color regions on the graphical display. The defect representation shown on the map can access the defect category, size, and the camera image showing the actual defect. The associated defect report contains a summary of the product performance and all the defect information listed by distance (and reversed distance if rewound).
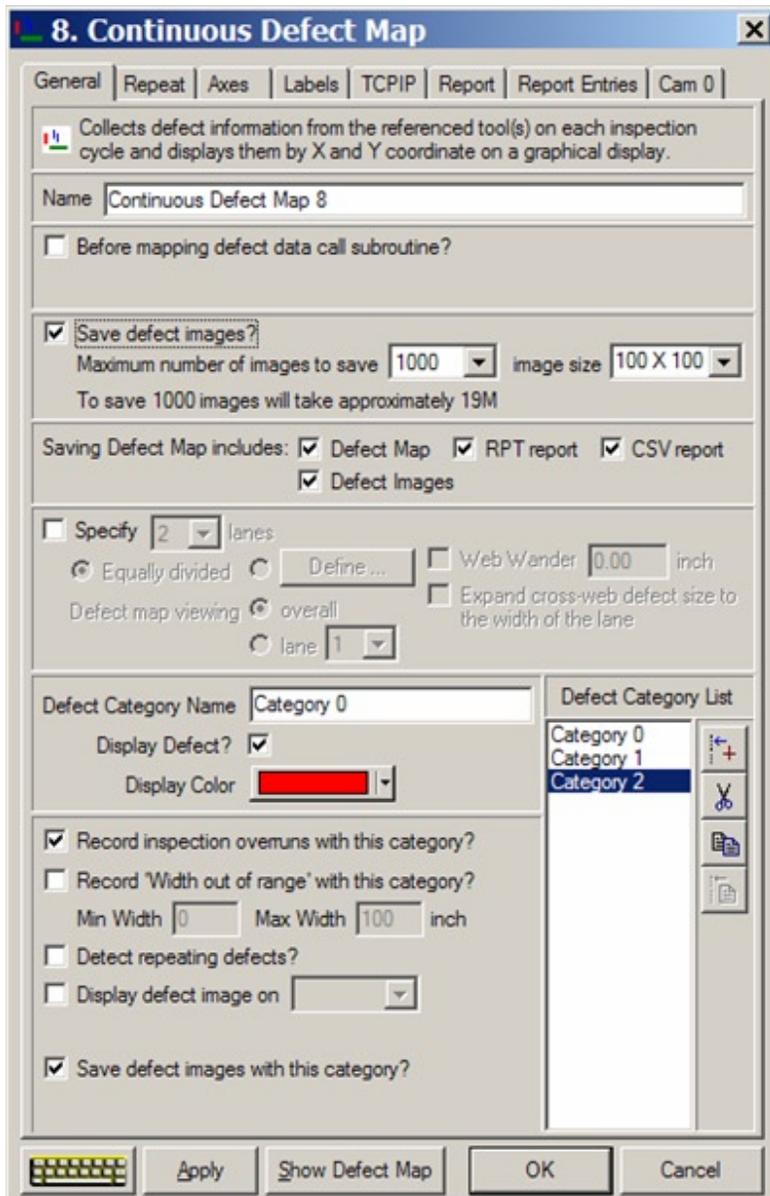
Only one **Defect Map** tool is required for any inspection. Place the tool at a point in the inspection where it is executed during each inspection cycle (like a subroutine). If you need more than one instance, separate them per task.

In multiple camera windows, defects that span adjacent cameras are considered individual entities and are not joined in the report data although they may appear joined on the map. A defect is counted twice if it is found in an overlap between cameras.

Working with the Defect Map

A Sentry 9000 application may control the Defect Map by using the Defect Map and Discrete Defect Map functions of the Calculator tool. For example, the Defect Map may be saved or reset by a Calculator tool. **Note:** For proper operation, the Defect Map MUST be reset by a Calculator tool in the **Inspection Initialization** task.

General dialog page

Name

If you want to change the default name of the **Continuous Defect Map** tool, enter the new name into this text field.

Before mapping defect data call subroutine?

Check this box to call a subroutine before mapping defect data, for example, for image processing before the collection of defect data. Select the subroutine from the drop-down list.

Save defect images?

Check this box to save images of the detected defects. The approximate amount of memory (up to a 512 MB maximum) necessary to save the images is shown.

Maximum number of images to save

Select the maximum number of images to save from the drop-down list.

If the number of defect images exceeds the specified mazimum value, the system will replace the oldest (first) images with the most recent. Note that all of the defect data is retained in the report and none is discarded; only the images are discarded.

Image size

Select the image size in pixels from the drop-down list.

Note: When you save the defect map, by default, the map, graphics, report, and images are saved in a subdirectory with the application name and a date/time stamp. The images are stored in RAM (not on the hard drive) until the map is saved. If you choose to discard the map, the images are discarded also. The number of images that can be stored is directly dependent upon the amount of memory available. To view the amount of RAM installed on your computer, right-click the **My Computer** icon in Windows and select **Properties**.

Use the following guidelines:

- At least 1GB of RAM is suggested when saving images using the Defect Map.
- Performance is best if windows memory paging is off.

Saving Defect Map includes:

Select the components to include when a Defect Map is saved to the hard drive.

Defect Map

Check this box to save the Defect Map data.

RPT report

Check this box to generate and save a defect report in text format.

CSV report

Check this box to generate and save a defect report in comma-separated values format (for export to a spreadsheet).

Defect Images

Check this box to save images. This option is available only if **Save defect images?** is enabled above.

Specify __ lanes

To divide the image across its width into multiple defect map lanes, check this box and select the number of lanes from the drop-down list.

Equally divided

Select this option to create all lanes of equal width.

Define…

To specify the width of each lane individually, click this button and configure the lanes in the pop-up window. Enter the width of each lane (measured in the **System Measurement Unit** defined on the General page of the System Setup dialog.)

Web Wander

Specify the allowable **Web Wander**. Any defect located within this diatance of a lane boundary will be recorded in both the actual lane and the adjacent lane.

Expand cross-web defect size to the width of the lane

Select this option to expand the width of any defect to the width of the entire lane.

Defect map viewing

Select **overall** to display all lanes in the defect map. To display just one lane, select **lane** and use the drop-down list to select the single lane to display.

Defect Category List

Use the **Defect Category List** to Add, Cut, Copy, or Paste defect categories used on the Defect Map. Inspection tools are linked to these defect categories on the subsequent pages of the **Defect Map** tool dialog box.

Defect Category Name

To change the default name of a defect category, select the category in the list and enter a new name in the text field. This is useful for naming a type of defect, such as **Color Defect** or **Dark Spot**.

Display Defect?

Check this box to display defects in the selected category on the Defect Map.

Display Color

Use the drop-down menu to select the color in which to display defects in the selected category.

Record inspection overruns with this category?

Check this box to use the selected **Defect Map** category to record system overrun regions. These are regions marked on the Defect Map as areas where the inspection data may be unreliable because a sync signal was received to trigger the start of a new inspection before the inspection by the current camera was completed. The overrun region marked spans the entire width of the material in the Defect Map Display. Overrun logging must first be enabled for this option to work; see the I/O Setup **Advanced Configuration** dialogs.

This function can be assigned to only one **Defect Category**. If the function has been assigned to a Category, this parameter will not be available for any other Category.

Contact AccuSentry for assistance with this advanced function and to inquire if it applies to your inspection needs.

Record 'Width out of range' with this category?

Check this box to use the selected **Defect Map** category to record inspection regions where the width of the inspected material is beyond the specified width tolerance range. This option requires that the left and right edges of the material not be fixed values but are detected by Line Fit tools (referenced on the Defect Map tool Axes page) during each cycle.

Min Width

Specify the minimum allowable width in inches.

Max Width

Specify the maximum allowable width in inches.

This function can be assigned to only one **Defect Category**. If the function has been assigned to a Category, this parameter will not be available for any other Category.

Detect repeating defects?

Check this box to detect and mark defects that repeat on every inspection cycle. Repeating defects are defined on the Repeat page.

Display defect image on

Check this box to display an image of the defect in the selected Camera Image Window.

Repeating only?

Check this box to display only repeating defects in the Camera Image Window.

Save Defect Images with this Category

When **Save defect images?** (above) is enabled, the user may select which individual defect categories images should (or should not) be saved.

Click **Apply** to apply changes to the tool configuration without closing the dialog.

To view the current **Defect Map**, click Show Defect Map.

See also:

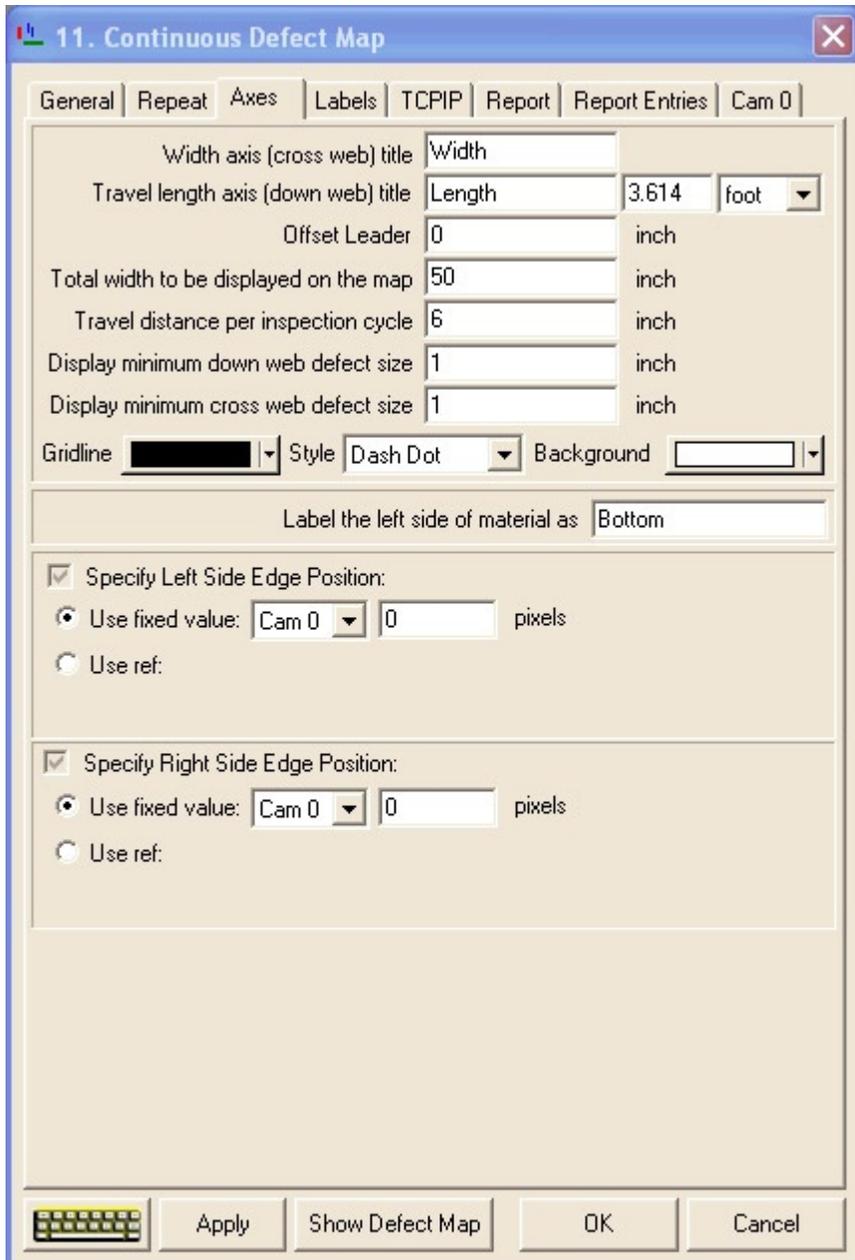## ⬛ Continuous Defect Map Tool: Axes page

Tools > ⬛ ⬛ > ⬛ > Continuous Defect Map > Axes

The **Axes** page of the **Continuous Defect Map** tool defines the labeling and plotting options for the *x*- and *y*-axes on the Defect Map.

For an illustration of how camera inspection areas are handled in Image Windows, see The x and y-Axis in Multiple Camera Inspections.

Note: The **System Measurement Unit** defined on the General page of the System Setup dialog defines the unit used for the **Axes** parameters below and the Camera Setup page defines the calibration scale of each camera. These must be set correctly for reliable map results.

Width axis (cross web) title

Enter a name for the Width axis displayed on the Defect Map.

Travel length axis (down web) title

Enter a name for the Length axis (direction of travel) displayed on the Defect Map. Specify a length and select the unit of measurement from the drop-down list.

Offset Leader

Specify the length of the beginning of a roll which will be discarded later. Any defects detected in the **Offset Leader** of the roll will not be included in the defect counts and statistics. This parameter gives the production line hardware time to reach the proper speed for the inspection cycle.

Total width to be displayed on the map

Specify the total width of the area displayed on the Defect Map. Typically, this is the total width viewed by the camera or cameras, and this width usually exceeds the actual width of the product.

Travel distance per inspection cycle

Specify the distance that the product travels per inspection cycle.

It is a good practice to include some overlap in the specified **Travel Distance**, so that slightly more material than the actual travel distance is viewed and inspected. The overlap distance should follow Nyquist's Sampling Theorem — that is, the overlap should be at least twice the size of the smallest defect of concern. Any defect seen in the overlap is counted twice. For example, if the smallest defect of concern is 0.1 inches (width or length), make the overlap at least 0.2 inches. If the actual travel distance (the distance between trigger signals) is 4.8 inches, specifying a **Travel Distance** of 5.0 inches will provide a 0.2-inch overlap.

Display minimum down web / cross web defect size

In the event that a defect is so small that it cannot graphically be shown on a large-scale map, these options 'enhance' the size of drawn defects. The actual defect size and its record in the report are not altered.

Enter the minimum size for the graphics of the defect that are on the **Defect Map** in both the **down-web** (direction of travel) and **cross-web** (width) directions.

To activate this display option, press the **Display Stretch Defects** button on the Defect Map tool bar.

Gridline

Color

Select a color for the gridlines in the Defect Map from the drop-down menu.

Style

Select a style for the gridlines in the Defect Map from the drop-down list.

Background

Select a background color for the Defect Map from the drop-down list.

Label the left side of material as

Specify a label for the left side of the Defect Map. The label **Bottom** is entered by default. The label is used to orient the viewer to the leading and trailing ends of the web relative to the **Defect Map**. It may be important to mark one edge of your product so that it can be related to the printed map and report. This label is accessible using an Operator Interface button or a Calculator.

Specify Left / Right Side Edge Position

The Left and Right edge positions may be specified by either a fixed value or the **Center X** parameter value of a Line Fit or Calculator tool.

Use fixed value:

Select this option to use a fixed value. Select the Camera to use and specify the pixel position of the Left or Right edge. Fixed values are typically used when the entire image is material and no edge is seen (for example, Left = 0, Right = Image Width).

Use ref:

Select this option to use the **Center X** parameter value of a Line Fit or Calculator tool. Select the reference tool from the drop-down list. The referenced tool(s) must be executed during each cycle.

Click **Apply** to apply changes to the tool configuration without closing the dialog.

To view the current **Defect Map**, click Show Defect Map.

See also:

Continuous Defect Map Tool: General Page

Continuous Defect Map Tool: Repeat Page

Continuous Defect Map Tool: Labels Page

Continuous Defect Map Tool: TCPIP Page

Continuous Defect Map Tool: Report Page

Continuous Defect Map Tool: Report Entries Page

Continuous Defect Map Tool: Camera Page

Defect Map Activity Display
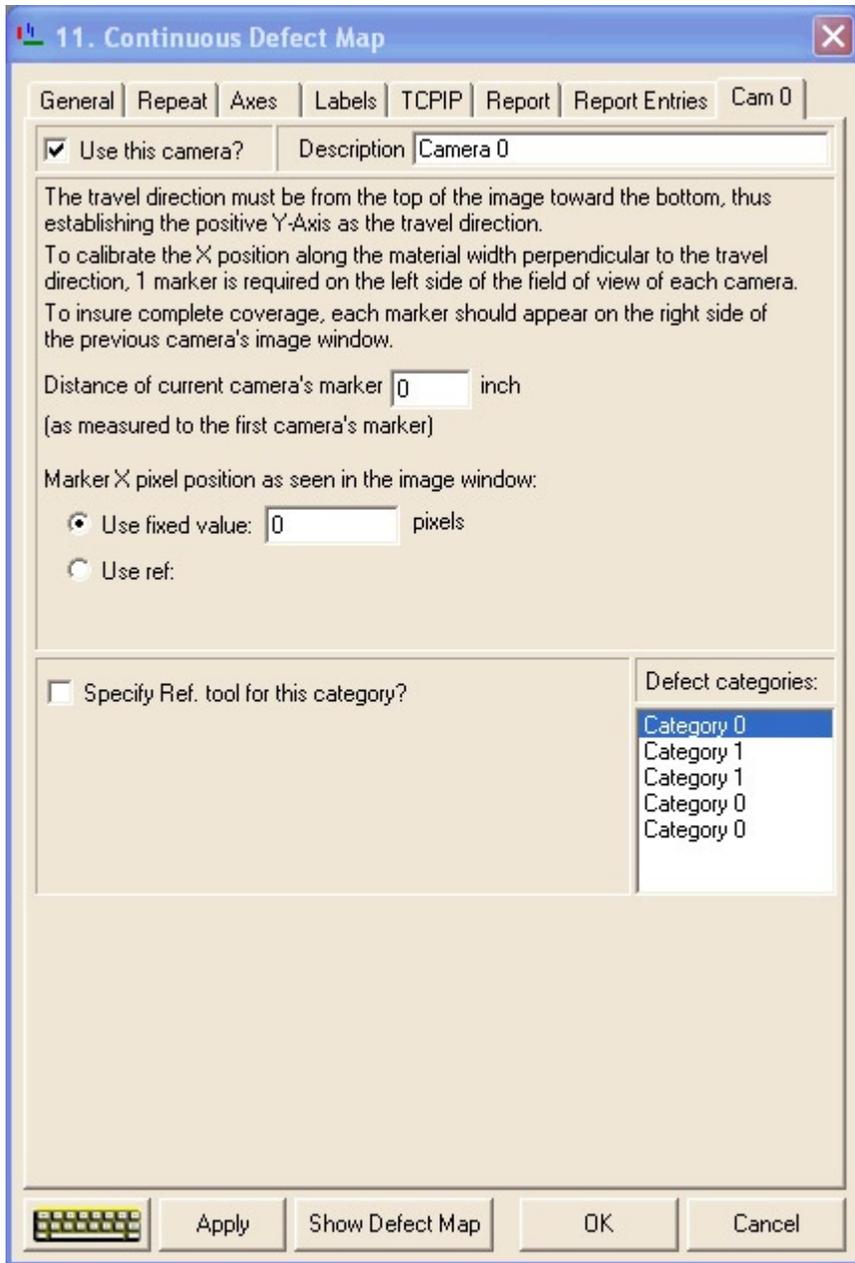
⊞ Continuous Defect Map Tool: Camera page

Tools > [← +] [← +] > [⊞] > {bmc Help0422.BMP} > Continuous Defect Map > Camera

The **Camera** page of the **Continuous Defect Map** tool configures each camera used to generate the Defect Map.

When using multiple cameras, the inspection areas should overlap in the cross-web (width) direction of the material. See Multiple Cameras and Sentry 9000 Image windows for an example configuration. There is a separate **Camera** page for each camera defined in the **System Setup** Camera Setup dialog; each **Continuous Defect Map Camera** page is labeled with the **Camera** name (e.g., **Cam0**, **Cam1**, etc.).

Use this Camera?

Check this box to use the current camera to generate the Defect Map. If you select this option, the Camera page is enabled.
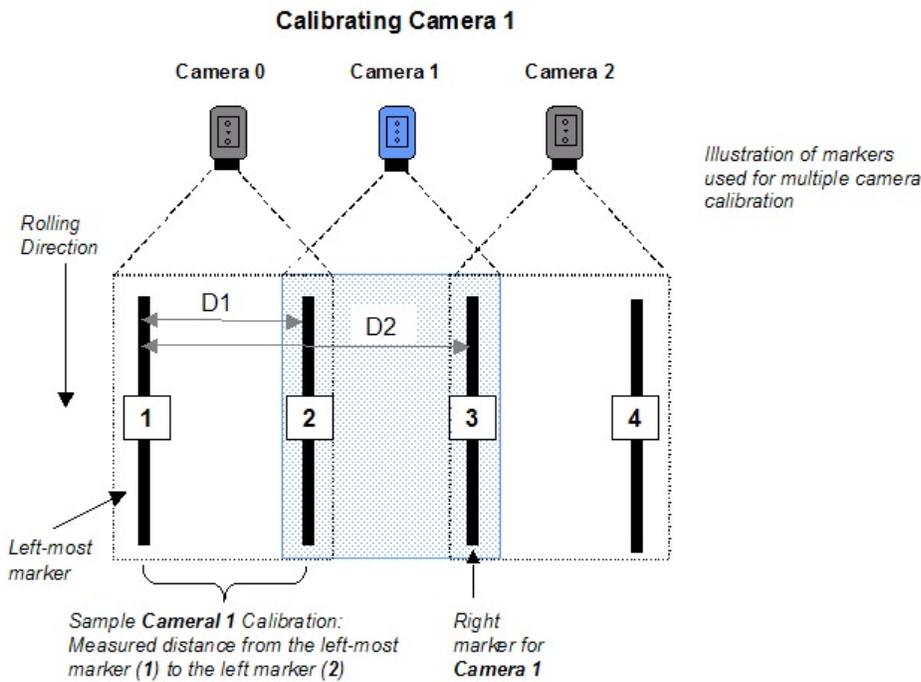
Description

If you want to change the default description of the Camera, enter the new description in the text field.

Calibrating the Camera *x*-axis Position

The travel direction of the material being inspected is from the top of the Image Window toward the bottom. This establishes the *y*-axis of the camera in the travel direction. *Be sure to note the camera mounting orientation and material flow direction.*

To calibrate the Camera's *x*-axis position (that is, its position along the width of the material), markers are used to separate the inspection areas assigned to each camera. They can be pieces of tape temporarily applied at known distances on the web or pre-printed calibration targets. A marker should appear at the far left and right sides of each camera image area (a marker is not required on the right side of the last camera — for example, Marker **#4** in the graphic below). These marker positions are static values that can be entered as fixed numbers or detected by Line Fit tools (previously set up in a calibration routine) and referenced in the **Defect Map** tool.

Calibrating Camera 1

Illustration of markers used for multiple camera calibration

Sample **Camera 1** Calibration: Measured distance from the left-most marker (1) to the left marker (2)

Distance of current camera's marker __

Enter the distance (in **System Measurement Unit** as defined on the General page of the **System Setup** dialog) from the left-most marker (Marker **#1** in the graphic above) to the left marker of the current camera being calibrated. For **Camera 0**, this distance is **0**. In the graphic above, this distance is **D1** for **Camera 1** and **D2** for **Camera 2**. If each marker is 20 inches apart, then **D1** = 20, **D2** = 40, and so on. Note that the right-side marker of one camera is used as the left-side marker of the following camera.

Marker X pixel position as seen in the image window

Note in the graphic above that each camera's field of view extends beyond the markers used to calibrate its position. This parameter specifies where the marker is positioned in the camera image (as opposed to the above parameter, which specifies where the marker is positioned in the total physical inspection web).

Use fixed value

Select this option to specify a fixed value in pixels for the position of the left marker in the current camera's Image Window.

Use Ref

Select this option to use a tool reference to indicate the **Marker X** position of the left marker in the current camera's Image Window.

Select a reference Calculator or Line Fit tool from the drop-down list, then select the reference attribute. If a Line Fit tool is used as a reference, the **Center X** attribute must be selected. The rectangle associated with the Line Fit is drawn on the left marker used for the calibration. The *x* pixel position is the center pixel position on the *x*-axis.

If a Line Fit inspection is used as a reference to find the marker, the tool should not execute every cycle but only once to establish the position before mapping begins; this could be in an initial calibration routine.

Defect Categories

Use this list to configure each Defect Category used on the current camera. To add **Defect Categories**, see the Defect Category List on the Defect Map Tool General Page.

Specify Ref. Tool for this category?

Check this box to specify a reference tool for the selected **Defect Category**. Select the reference tool and attribute from the drop-down lists.

Defect Categories configured to **Record inspection overruns** or **Record 'Wdith out of range'** are automatically assigned on the Defect Map Tool General Page, so they are not available for assignment here.

Note: The reference tool specified here defines the source of the defect information for the selected **Defect Category** on the current camera being set up only. It is best to maintain consistency across all cameras. For example, if you link **Cam0 Category 1** to a **Spot Check** tool, then **Cam1 Category 1** also should be linked to a **Spot Check** tool.

Record this category on failed ref. tool only?

Check this box to record the selected **Defect Category** in the Defect Map report only of the reference tool fails.

Click **Apply** to apply changes to the tool configuration without closing the dialog.

To view the current **Defect Map**, click Show Defect Map.

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See also:

Continuous Defect Map Tool: General Page

Continuous Defect Map Tool: Repeat Page

Continuous Defect Map Tool: Axes Page

Continuous Defect Map Tool: Labels Page

Continuous Defect Map Tool: TCPIP Page

Continuous Defect Map Tool: Report Page

Continuous Defect Map Tool: Report Entries Page

Defect Map Activity Display