Defect Concentration Diagram

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What

Defect concentration diagram is a simple visual tool that helps in collecting & analyzing data in a variety of situations/ work areas.
It is a simple visual aid to collect data about an area or idea you are investigating.
A sketch (or, picture/ layout of the part/ area) is used to display the location of defects in parts/ assemblies or, areas with defects shown by visual indicators.

When

Defect concentration diagram are used effectively in the following situations:

- During data collection phase of problem identification
- Collecting data to monitor the post solution situation
- Analyzing a part or assembly for defects to guide improvement efforts
- Investigating a part being produced with numerous defects
- Identifying positional patterns of problems/ defects

How

1. Design the defect concentration diagram
   1.1. Prepare a drawing (drawing, picture, or schematic) of the part/ assembly/ area
   1.2. Decide method of marking (how defects will be shown on the drawing) i.e. marking/ board pins/dot labels etc.)
   1.3. Let a person not involved in the design of diagram use it without assistance. Improve the diagram based on feedback, if required.
2. Train the people who work in the process/ area to collect the data
3. Collect the data
   3.1. Ensure that samples are as representative of the production process as possible.

3.2. Collect information about defect mode also, wherever possible

3.3. When more than one person is involved in data collection, collate all the data collected.

4. Mark the defect concentration diagram showing the location of each defect

4.1. Simply make a mark every time there is an occurrence of a problem in that location

4.2. indicate the defect mode also, wherever possible

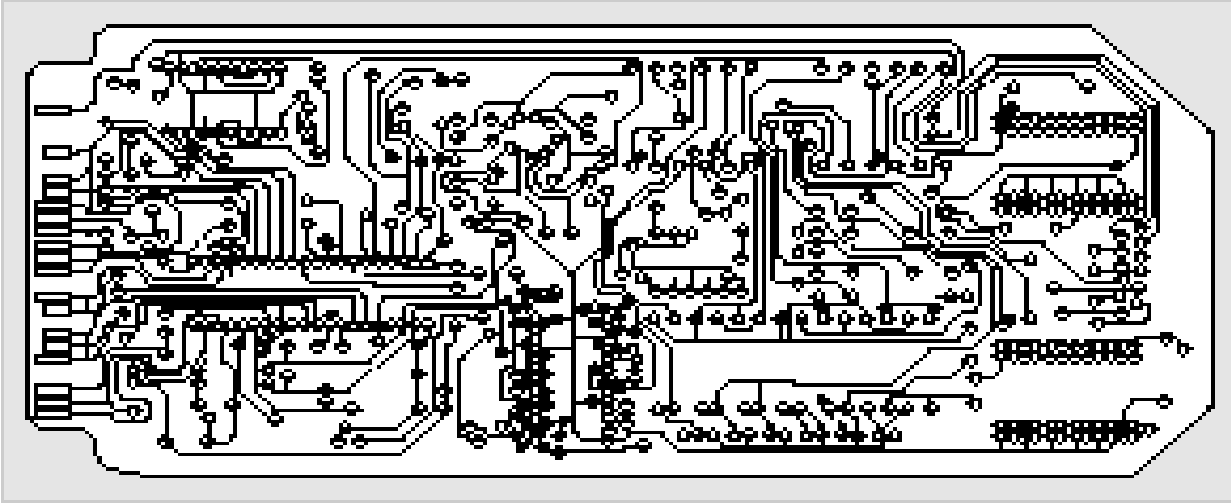
5. Analyze the diagram for patterns, diagnose problems and begin improvement actions.

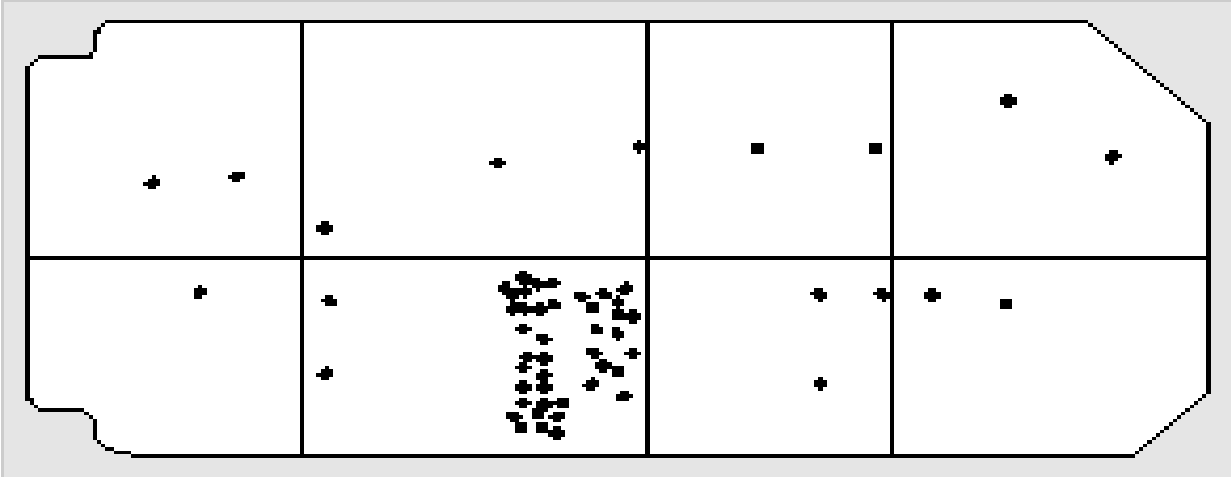
Examples

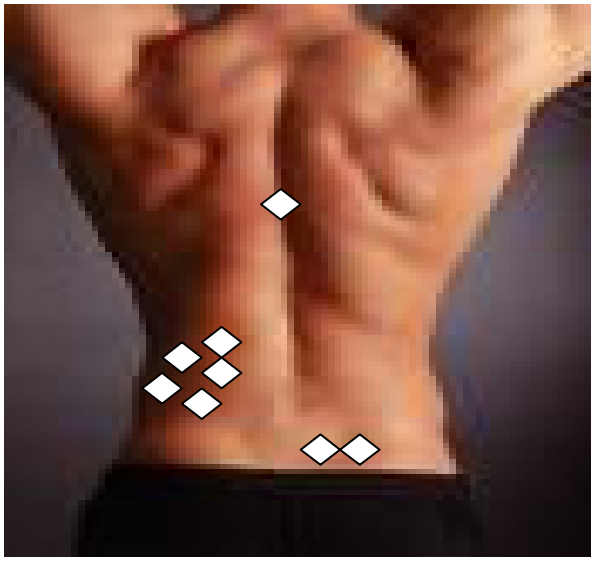
1. Analysing defect concentration pattern in a PCB

In an electronic PCB manufacturing the defect concentration diagram was used to study the variation pattern.

The resulting defect concentration diagram showed a clear defect concentration. Further analysis focussed on a few components & soldered joints in the PCB assembly.







2. Analysing muscular injuries in a production work station

Defect concentration diagram was used to analyse the frequent muscular injuries on a work station. It highlighted a clear pattern of injuries. The workstation was redesigned to improve the ergonomics.

3. Analysis of road accidents of a large construction site.

To analyse why the accidents were happening, road map of the site was used as a concentration diagram and each time an accident occurred the position of the accident was marked on the map.

The concentration diagram showed clear patterns in the location of accidents.

The organization used the information to place 'sleeping policemen' and traffic lights to slow down the traffic at the places where most accidents had been happening.

The situation was monitored and a fall in the number of accidents was noted.

Why

- ✓ The defect concentration diagram helps in identifying positional variation.
- ✓ By establishing the location of failures, the causes of failure can be investigated & possible solutions explored.
- ✓ Actions are guided by evidence, not assumptions.
- ✓ It is an excellent tool to enthuse data collection efforts. Involvement of non-production areas can be enlisted in quality improvement.

The visual appeal of the defect concentration diagram makes it an effective tool that can be used in a variety of situations/ work areas (Production, office, laboratories, construction sites, medical diagnostics, equipment maintenance, traffic manage.