What is Data Analysis?

Data Analysis is the conversion of raw data e.g. Sheets, charts, numbers etc. into easily understood information that can then be used to drive action.

Most forms of data analysis result in a chart, graph or data trail (a series of graphs) being produced, with an action statement describing what needs to be done next.

Turning data into information

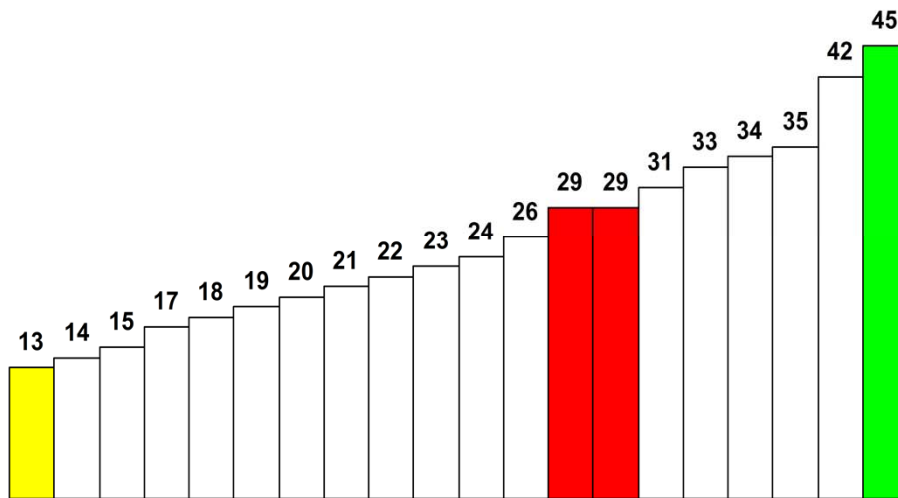| 25	19	28	21	18
30	33	24	36	22
17	12	34	15	47
25	32	13	44	16

To understand why we convert from raw data to another format try the following example.

How quickly can you identify the highest, the lowest and the one repeated number in this list?

Answer lowest 12, highest 47, repeated 25.
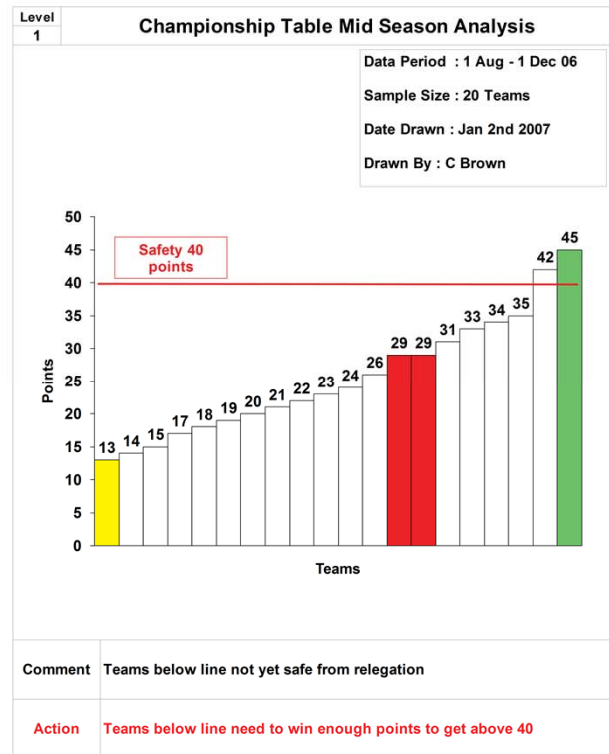
Turning data into information

"Which is the easiest to interpret?" The chart is the quickest and so the easiest.

"What makes it easiest?" Data arranged in ascending order, use of colour.

"Can we improve again on the chart? How?"

Turning Data Into Information

Level 1

Championship Table Mid Season Analysis

Data Period : 1 Aug - 1 Dec 06

Sample Size : 20 Teams

Date Drawn : Jan 2nd 2007

Drawn By : C Brown

Safety 40 points

Points

13 14 15 17 18 19 20 21 22 23 24 26 29 29 31 33 34 35 42 45

Teams

Comment	Teams below line not yet safe from relegation
Action	Teams below line need to win enough points to get above 40

If we add other relevant information in a standard format then we can start to turn the data into information we can then act upon.

- Using titles on the top of the axes gives us the context, what is the graph about and what are the valuables we are plotting.
- The level box shows us what position the graph takes in a data trail. E.g. The top level is 1, the next 2 etc.
- Using a target shows us if the data is reflecting a good or bad position.
- The data source box gives us background information on the data collection and allows us to repeat future analysis in the same manner for comparison.
- The comment explains the graph in one sentence
- The action tells us what needs to be done next. This may be further analysis, more data collection or a specific improvement action

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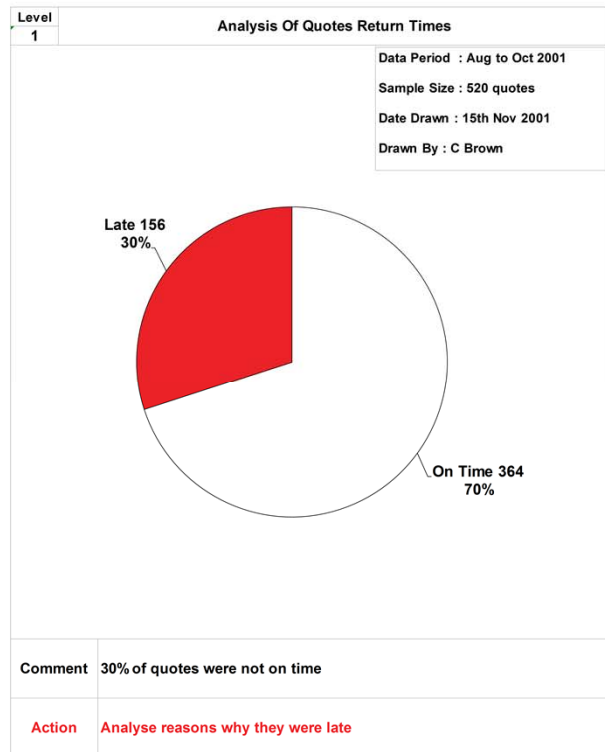# Turning Data Into Information
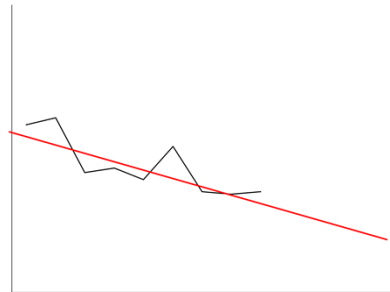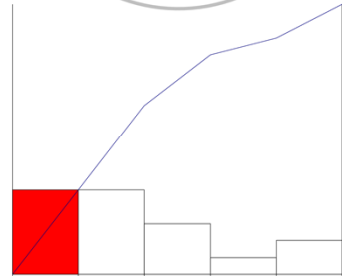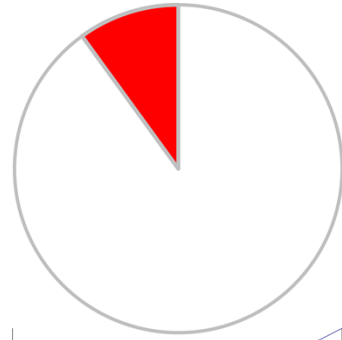
It is vital to keep the charts simple and ensure they tell a story.

The three charts we use most are the pie chart, the Pareto chart and the trend chart.

These are explained in more detail on the following slides.

Pie Chart Example

Level 1	Analysis Of Quotes Return Times	
	Data Period : Aug to Oct 2001	
	Sample Size : 520 quotes	
	Date Drawn : 15th Nov 2001	
	Drawn By : C Brown	

Late 156
30%

On Time 364
70%

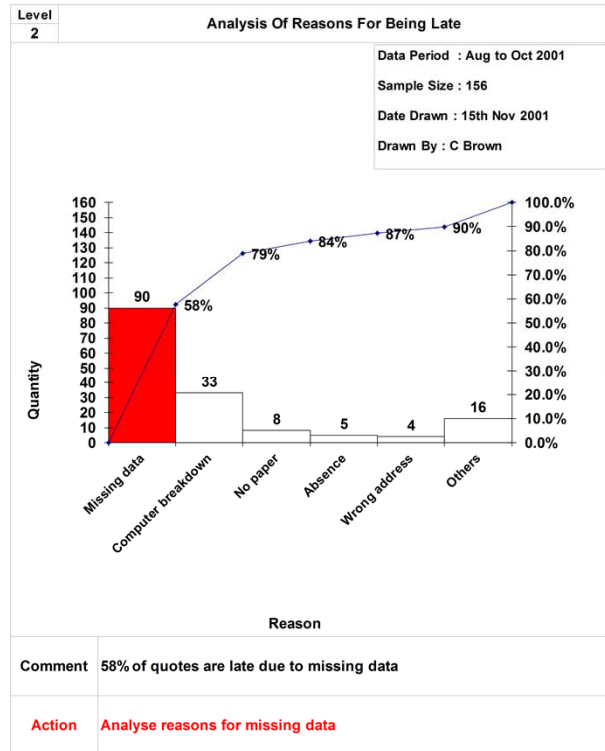| Comment	30% of quotes were not on time
Action	Analyse reasons why they were late

Pie charts provide a simple and very visual picture of the relative proportions of performance in percentage and value by cumulating data over a period of time

They are used to highlight the overall current situation and focus attention on the need to improve. They should have a maximum of three segments to keep the picture simple.

Pie charts allow a direct comparison before and after an improvement activity but not the on-going trend of performance. They have no target line.

Pareto Chart Example

Level 2

Analysis Of Reasons For Being Late

Data Period : Aug to Oct 2001

Sample Size : 156

Date Drawn : 15th Nov 2001

Drawn By : C Brown

Comment | 58% of quotes are late due to missing data

Action | Analyse reasons for missing data

Pareto Charts are the best method to identify the focus for improvement for complex problems.

It ranks problems in descending order and shows the significance of each issue as a percentage of the whole. That allows concentration of limited resources on the biggest issue and so potentially the biggest improvement.

The percentage figure should never be omitted as it allows direct comparison before and after improvement activities, irrespective of the sample size.

Pareto charts have no target line.
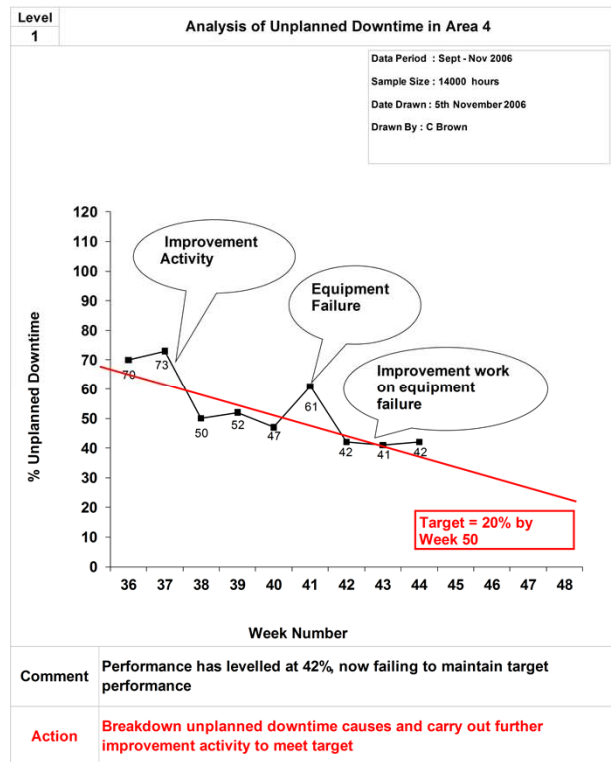
Data Trail example
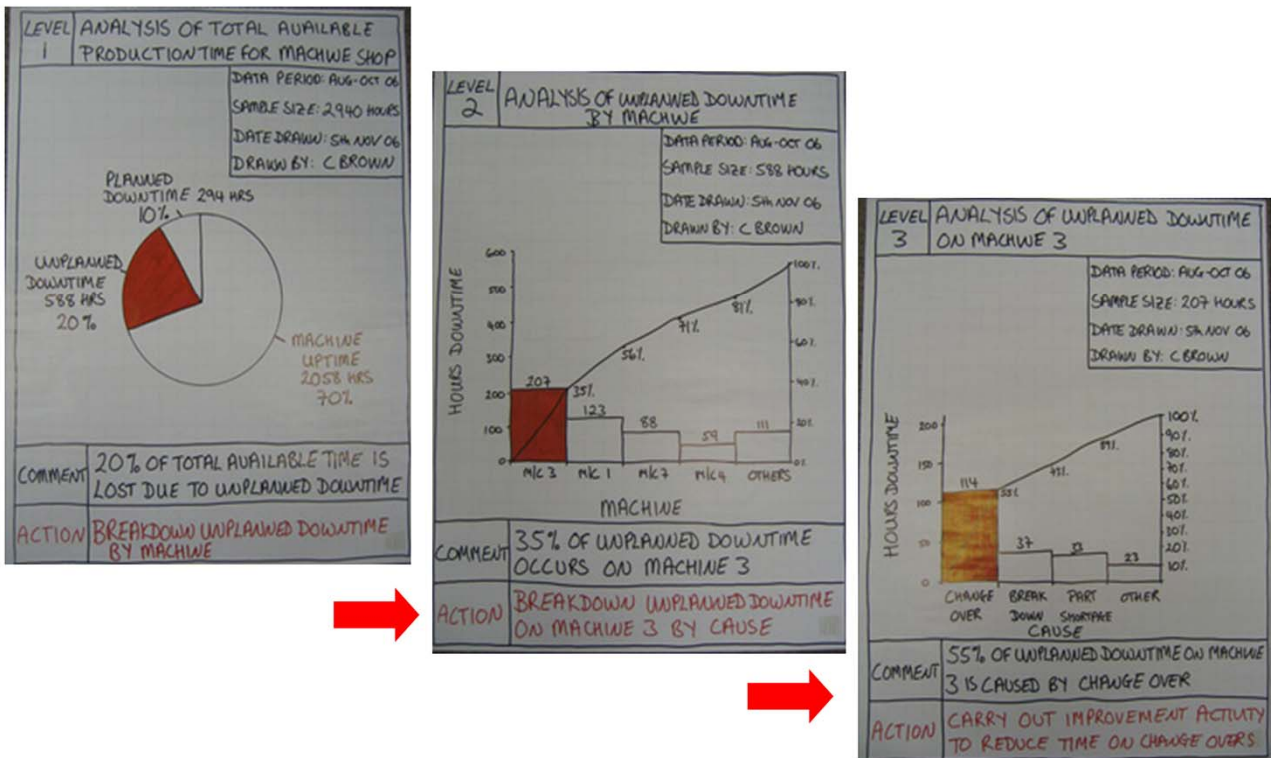
A data trail is used to break top level measures down in order to identify focus improvement actions, through the application of PDCA (Plan, Do, Check, Act).

A Data Trail is a linked series of charts that show the successive breakdown of the data. Each chart concentrates solely on the breakdown of the largest problem of the previous chart.

Because of the data analysis method used, the final action should be focused on the single largest issue. Tackling this issue with the finite resource available should give the greatest benefit. It is now possible to set a SMART objectives for the overall activity; by knowing what % of the overall problem we are aiming to rectify we can set a new performance target.

Graphs used are normally Pie and Pareto.

Trend Chart Example

Level 1 — Analysis of Unplanned Downtime in Area 4

Data Period : Sept - Nov 2006
Sample Size : 14000 hours
Date Drawn : 5th November 2006
Drawn By : C Brown

Comment	Performance has levelled at 42%, now failing to maintain target performance
Action	Breakdown unplanned downtime causes and carry out further improvement activity to meet target

Trend charts are used to show performance against target over time and progress towards the organisations targets. They are a good record of historical performance.

This is unlike the Pie and Pareto charts that show cumulated performance over a period of time and which do not feature target lines.

Trend charts should show performance as a percentage figure where possible. Text bubbles should be used to indicate where improvement activities or problems have occurred stating major reasons for success or failure against target. Hand drawn bubbles on live charts are very powerful.

They can be used with control limits to highlight the difference between a minor process fluctuation and a true performance change. They can also encourage companies to continue capture of key areas for improvement activities.

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