



Effective use of Data

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What are we trying to achieve?

- What are we trying to measure?
- How can we measure this quickly and without a lot of human intervention, so we can spend our time using the results?

Examples in this presentation:

- Example 1 – Market Research
- Example 2 – KPIs for Software
- Example 3 – KPIs for Electronics Assembly
- Example 4 – KPIs used to predict reliability

Example 1 – Market Research

- A market research organisation supplied lists of projects for a supplier of those types of products
- This was done using a paper system and manual sorting and comparison with a list of customers
- An alternative was to supply the data using Comma Separated Variable (CSV) files
- These were input into an Access database automatically
- The data was sorted automatically through a series of programs
- The user used the results to approach the correct contacts at potential clients
- Previously they had spent most of their time paper sifting, now it is spent seeking orders

Example 2 – Key Performance Indicators (KPIs) for Software

- The following were selected as KPIs
 - Completion of projects to schedule
 - An index of software reliability
- The sources of data:
 - The Project database, where design projects were monitored
 - Bugzilla – open access software for recording and tracking bugs
 - The accounts system for sales values

Completion of projects to schedule

- Projects were given numbers and the key targets were entered into a database
- These key targets included:
 - Planned completion dates
 - Planned time spent on the projects
- The KPIs were:
 - Slippage (if any) from target completion dates
 - Excess (if any) time spent on the projects

Calculating these KPIs was simple once they were in a table, which was loaded semi-automatically

An index of software reliability

Only bugs on software that had been released were included. Whether the software had been released was established from the tables used to calculate the previous KPI.

The index compared the number of bugs with the value of sales. This overcame the problem that software can be any of a number of different modules combined together.

Example 3 – KPIs for Electronics Assembly

- The following were selected as KPIs
 - Delivery of Completed assemblies to schedule
 - Proportion of assemblies that failed with customers
- The sources of data:
 - The MRP system records:
 - Planned shipment dates
 - Actual shipment dates
 - Returns from customers
 - Reshipment of returns

All this was loaded into an Access database and **the only intervention by the user was to classify the faults on the returns.**

Other information found from this database

- The same MRP database monitored the Purchasing and Goods inwards functions. This information was also downloaded into the Access database. The following were produced **with no further intervention by the user:**
 - Delivery to schedule of parts by suppliers
 - Failure rates at Goods inwards

Example 4 – KPIs used to predict reliability

- The following were selected as KPIs
 - Delivery of Completed PCB assemblies to schedule
 - Proportion of shipped PCB assemblies that failed at Test
 - Proportion of PCB assemblies that failed with customers
- The sources of data:
 - The MRP system records:
 - Planned shipment dates
 - Actual shipment dates
 - The Drawing Office system
 - PCB Bills of Materials (BOMs)
 - The KPI database
 - Numbers of returns from customers
 - Faults on returns

All this was combined automatically to produce the KPIs above

and:-

Predict the reliability of new designs from MIL-HDBK-217

MIL-HDBK-217 – Reliability Prediction of Electronic Equipment is published by the US Department of Defense.

It contains failure rate models for the various part types used in electronic systems, such as ICs, transistors, diodes, resistors, capacitors, relays, switches, connectors, etc. These failure rate models were based on the best field data that could be obtained for a wide variety of parts and systems; this data was analysed and, with many simplifying assumptions thrown in, used to create usable formulae to predict the reliability of components based on their complexity.

Its drawback is that it uses data that is quite old, and therefore complex components, particularly ICs, get very low reliability scores predicted for them compared to what is found in practice.

Predict the reliability of new designs from field data

Sources of data:

- The numbers of PCB assemblies shipped
- BOMs of the PCB assemblies
- The MIL-217 classifications of the components

Gave us the numbers of different types of components shipped with their different MIL-217 ratings and:

- The numbers of components that failed after shipment
- The MIL-217 classifications of these components

This gave us the failure rate of different MIL-217 classifications of components with customers. These were used to predict the failure rates of new designs and to see if components were failing in unexpectedly high numbers, indicating possible design errors.

The same methodology was used for failures during production

Was this information interesting?

- If you are developing a database, plan how you are going to use it first!
- Write it up as you go along, and how to use it, you may not be the eventual user!
- If you haven't done so already, go on a good training course! It will pay for itself
- Or you can contact us and we can do the work for you, without you having to recruit extra staff