

From its founding, Data Analysis Australia has followed the principle that a key responsibility of statisticians is to provide integrity to data and the use of data.

This newsletter illustrates that role through recent work for the mining industry and in the use of address based data.

Dr John Henstridge
Managing Director

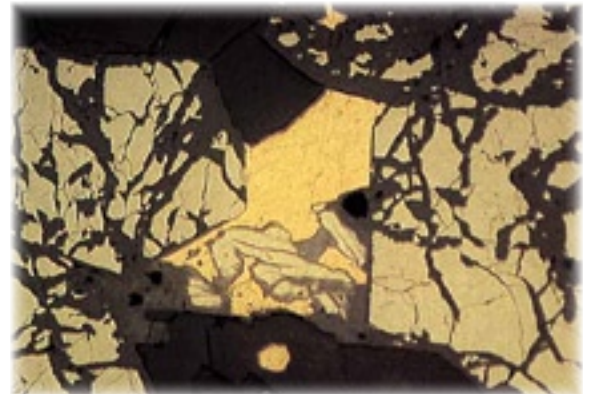
The Statistician in Quality Assurance

Quality of goods and services is important to all customers. Therefore the person who takes responsibility for assuring the quality is critical to both the organisation and its customers. In many professional firms it might be a senior partner while in many large manufacturing companies it might be a senior engineer. Often the role of that person is to ensure that standards and specifications are met.

It may be a surprise to some that statisticians are increasingly filling this role of providing quality assurance. The reason is simple, reducing variation in a product or service is often the most cost effective way of reliably meeting specifications. Understanding variation is the key to this and is also the statistician's chief skill. It is perhaps not surprising that many of the prominent names in the quality movement – Shewart and Deming to name just two – described themselves primarily as statisticians.

Many of the techniques in wide use in quality assurance are basically statistical but have been simplified for use by non-statisticians. These include such tools as control charts and histograms. However an experienced statistician has the greater depth of understanding to handle the unexpected and to take advantage of unusual situations.

An example of this is a recent project where, as statisticians, Data Analysis Australia provided certification for a reference material, or standard, to be used by mineral laboratories as a part of their own quality assurance procedures. These mineral standards are a critical product of our client, Western Mineral Standards, with laboratories around the world using them to calibrate their results, in this case for measuring gold concentrations in mineral samples. Several standards were being developed simultaneously and as this was a new subsidiary and area of business for Western Refractories, extra care had to be taken in the review of the processes used to ensure uniformity of product.



Gold in most ores is locked as small grains in the mineral matrix as shown in this microscope image (100 times magnification).

The standards are made in batches of one to two tonnes by milling carefully chosen ore and it is important not only that the reference value or gold concentration is accurately known, but also that it is constant through the batch. The certificate provides this reference value as well as information that may affect the use of the product.

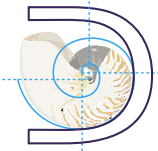
The usual process for certifying a standard is to have it analysed by a number of high quality laboratories around the world. They do not know what values they should expect – instead each provides their best possible estimate. If a number of laboratories each give a very similar value it can be used with some confidence.

From the start, this project had some unusual features that made the use of a statistical approach particularly beneficial. Data Analysis Australia statisticians designed an innovative testing regime that sent a number of samples from each standard batch to each laboratory, balancing also for possible trends within each batch. This provided many benefits, including the ability to measure differences between laboratories while at the same time thoroughly investigating variation within each batch. The result was not only improved accuracy but also a much lower overall cost than if the batches were separately tested and certified.

As a statistician accredited both nationally and internationally, Dr John Henstridge of Data Analysis Australia took the overall responsibility for assuring quality and the reference value of these standards. A very appropriate role for a statistician.

Further information can be obtained from **Chris Milne** at Data Analysis Australia.

DATA



STATISTICS

ANALYSIS



MATHEMATICS

AUSTRALIA



INFORMATION

Company News

We welcome **Kathryn Creelman** to our administration team. Kathryn has recently completed a Certificate III in Business from City Business College. **James Andrewartha**, who is currently studying for a Bachelor of Engineering (Software) at University of Western Australia (UWA) has joined our IT department to provide networking and IT support.

We also welcome a new consultant. **Natalie Smith** has joined us after recently completing a degree in Applied Mathematics and Computer Science at UWA.

Departing the company were **Terri Burgess** and **James Henstridge** to separately pursue new business ventures. We wish them all the best.

Congratulations to **Laura Firth** and husband Marty on the birth of their first child and dependent variable, Michaela. Laura is currently on maternity leave.

Congratulations to **Rebecca Gordon**, **Meredith Regan** and **Anna Munday** who have all recently been promoted to Senior Consultants.

John Henstridge was the keynote speaker at the Urban Development Institute of Australia (WA) conference in Bunker Bay. His topic dealt with population growth in the south-west and the effect of the ageing population in the region. John also spoke at the June meeting of the Statistical Society of Australia (WA Branch).

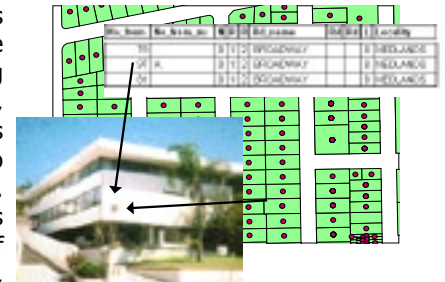
The Data Analysis Australia delegation of **Anna Munday**, **Meredith Regan**, **Jodie Thompson** and **John Henstridge** this month attended the Australian Statistics Conference at the Cairns Convention Centre.



Virtually every house, business, office, or any place has an address that describes its physical location. This address is used for many purposes – for mail deliveries, for visitors to find out where a building is and in identifying property ownership.

However addresses are useful for more than just describing how to get there, they can also act as a geographic link to other places and areas. A simple example is the suburb name – if you know the suburb,

you can group it with other places in that suburb. Then it is possible to start attaching suburb-based information, such as household characteristics from the Census. Hence the address is the start of much statistical analysis.



The process of linking addresses to geographic information (also called geocoding) places a higher requirement of accuracy on the address details than would be needed to get a letter to the right door. This issue's Analytical Ideas considers various definitions and descriptions of address accuracy and how the way that street and suburb information is collected and stored can affect its usefulness in linking it to other geographically referenced information.

The Paper can be found at www.daa.com.au/analyticalideas/2004/addressdata.html

Staff Profile - Chris Milne



Chris Milne joined Data Analysis Australia in 2002 shortly after completing an Honours degree in Statistics and Mathematics at Murdoch University.

In his final year at Murdoch, Chris received the 2001 Honours Scholarship awarded by the WA Branch of the Statistical Society of Australia. Chris used this scholarship to help fund his research into robust estimation methods. This research formed the basis of a paper Chris co-authored with his honours supervisor, Dr Brenton Clarke, which will be appearing in a future edition of the Australian and New Zealand Journal of Statistics.

As a Consultant Statistician, Chris has developed expertise in a wide variety of areas including mathematical and statistical modelling, time series analysis, survey design and analysis, experimental design and robust estimation methods. He also has extensive experience in the analysis of biological data, including modelling vegetation growth, analysing congestive heart failure in people and conducting survival analyses.

In addition to his many statistical and mathematical skills, Chris is also an accomplished artist, often providing us with entertaining drawings.

Classic Quote

"Incomplete knowledge must be considered as perfectly normal in probability theory; we might even say that if we knew all the circumstances of the phenomena there would be no place for probability and we would know the outcome with certainty."

Emile Borel (Mathematician, war hero, journalist, politician, French Minister for the Navy 1926-40, Resistance fighter, whose mathematical work provided much of the basis of theoretical statistics. Who says that mathematicians and statisticians are boring?)

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