To Measure Or Not To Measure - That is the Question!

'Elf and Safety' (H&S) gets something of a bad press these days with the most benign of activities being banned by allegedly over-zealous people. This is unfortunately driven as a response to the 'where there's blame there's a claim' culture that has emerged over the last few years.

" Casella Measurement's vision is one of an integrated bodily worn system that conceptually allows remote monitoring of relevant agents via a local network or indeed the internet. "

ASSESSMENT TYPE	Documentation Level		
	Low	**Medium**	**High**
AREA MONITORING	Specific data not documented	Bay to bay (noise) map	Assign area measurements to risk groups
DOSIMETRY	Unobserved	Targeted	Statistically valid
PROFILING	WSM/Area Samples	Hybrid	Task Based

COMPLEXITY

COST

Source: Phase To Inc

However, when it comes to the workplace it is a different matter. The International Labour Organisation (ILO) report that some 160 million people worldwide suffer from occupational related diseases, with over 2 million deaths attributed annually as a result. These figures don't include countless fatal or serious injuries caused by accidents, which makes working seemingly a risky business.

Risk is all about combining the likelihood of something happening with the severity of that occurrence and it is an assessment of that risk which drives measures to remove or mitigate the potential root cause. It's worth making a distinction between safety and health issues early on. Safety is associated with short term, potentially life-threatening issues like exposure to gas (with a risk of explosion or asphyxiation) or heatstroke due to a combination of high temperature and humidity, for example. Health issues on the other hand can be caused by relatively longer term accumulated exposure to agents like noise, vibration, dust and chemicals, the latter two particularly leading to the premature deaths mentioned by the ILO.

Many organisations are now implementing an Occupational Health and Safety Management System (OHSMS) as part of their risk management strategy to address changing legislation and protect their workforce. An OHSMS promotes a safe and healthy working environment by providing a framework that allows the organisation to consistently identify and control its health and safety risks, reduce the potential for accidents, aid legislative compliance and improve overall performance. Standards like BS OHSAS 18001 can be adopted by those wishing to implement a formal procedure to reduce the risks associated with health and safety in the working environment for employees, customers and the general public.

An adage cited during a sales conference keynote speech by a CEO was "you can't manage what you don't measure".

It's probably timely then to pause and reflect on the term 'measure', which according to the dictionary means "determining size or quantity as ascertained or ascertainable by measuring" and to make a distinction at this juncture with 'monitoring' "to observe, supervise, and keep under review for the purpose of regulation or control".

In more complex scenarios than Casella's post room, measurement then often features as a tool in the risk

assessment process but with a plethora of physical & chemical agents to deal with it can be a daunting task. David S. Cmar and John A. Rioux in their web article[1] Choosing the right noise exposure assessment tool state that the chosen strategy depends on many circumstances and the matrix reproduced below summarises the available tools for noise exposure assessment (but this equally applies to agents other than noise).

They go on to say that "the matrix shows a complex relationship between assessment types and documentation levels and how these relate to real-world issues such as cost and complexity" going on to argue that "none of the methods describes in the chart above can be characterised as good or bad; they can all be equally effective if applied for the correct purpose." Area monitoring refers to the use of a hand held (sound level) meter, whilst (noise) dosimetry allows a bodily worn instrument to measure across a full shift (FS), which can be targeted at certain 'mobile' workers and is a good compromise in terms of cost and complexity. According to an article in Safety +Health[2], the task based (TB) concept revolves around creating a detailed breakdown of the various elements a person typically would perform and then calculating an exposure. This means making assumptions about the tasks performed and typical time 'on task(s)' combined with a noise level based on a sample of each individual task. It is easy to see why this approach is both costly and complex but as one might expect software packages exist to help the process.

Author Details:
Tim Turney, Market Manager, Casella Measurement
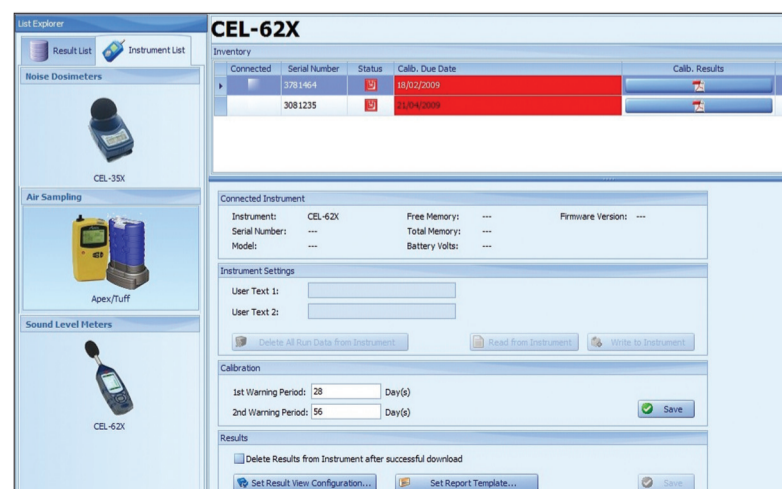Address: Regent House, Wolseley Road, Kempston, Bedford, MK42 7JY, UK
Tel: +44 (0)1234 844133
Fax: +44 (0)1234 841490
Email: timturney@casellameasurement.com
Web: www.casellameasurement.com

Handbook on Mine Occupational Hygiene Measurements[3] also uses a similar adage "if you don't measure, you won't know". It goes on to say that "the cardinal importance of selecting the most appropriate instrumentation, the correct use thereof and the correct interpretation of results to assist in the making sound professional judgements on the working environment and worker exposures cannot be over-emphasised in protecting the health of workers". The rear cover also attributes yet another play on the adage to Lord Kelvin in the 19th Century, "if you can not measure it you can not improve it".

The construction sector can be another extreme environment and studies have been undertaken comparing FS measurements and TB assessments with varying degrees of correlation. One such study reported in the AIHA Journal[4] concluded that TB estimates include a substantial degree of error compared with a FS measurement approach. Research like that being headed by Pam Susi, Director of Exposure at CPWR, the (US) centre for construction research & training, is ongoing into the use of TA.

Most instrumentation vendors see themselves just in the measuring business and tend to be vertical in nature, specialising in just one discipline. By contrast, Casella Measurement is positioning itself to provide a complete solution for workplace assessment across a range of physical and chemical agents. This has been facilitated by a significant investment in Casella Insight data management software.

Rather than using several software applications to download from many instruments, Casella Insight allows data from a range of supported instruments to be downloaded and stored into one versatile package. Data is stored on a centralised database which may be managed by Person, Place or Process criteria. Data can be viewed in tabular or graphical format and analysed as necessary.

When an instrument is connected to Casella Insight, it automatically downloads stored data. Casella Insight manages all the instrument's re-calibration dates and gives notification when they are due, as well as storing the actual calibration certificates. Users of existing Casella CEL software packages e.g. dB35 can import previously downloaded data. While data within Casella Insight can easily be exported and sent to other colleagues or users, allowing data to be shared easily across larger organisations.

Exposure levels can be colour coded by a simple 'traffic light' system, making it easy to see which individuals or locations exceed action levels. These limit values can be user defined if a more stringent action value is desired. Graphs can be further analysed by adding zones (shown below) which subsequently provides exposure levels, inside and outside these zones.

This allows the exclusion of extraneous events, breaks etc to provide comparative exposure calculations. Any exclusion zones added to data are retained with the data file.

A simple 'tree view' can be created with which to store and manage data by Person, Place or Process since, once data has been downloaded, files can be 'dragged and dropped' to the relevant tree location and all data subsequently stored within a central database. Templates are provided to view data, which can be further customised, displayed and reported as simply or as comprehensively as required.

Reports can be stored in multiple formats (e.g. .pdf, .jpg, or .csv)
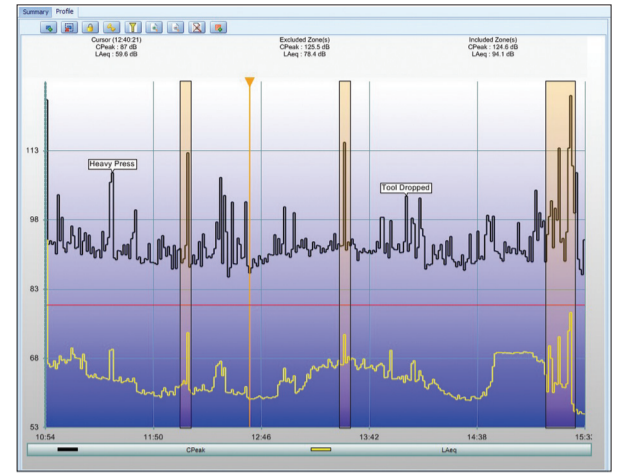
allowing them to be shared and viewed easily, as well as exported to other applications. To create that all-important report, 'right clicking' on the appropriate part of the tree view activates the report wizard and allows reported parameters to be selected as required and report settings to be retained for the next time it is used. Notes can be added to data, which appear on reports as required, typically including details about the measurement and subsequent conclusions and recommendations required to reduce exposure.

A unique feature of Casella Insight is that exposure data from multiple agents may be viewed and reported simultaneously and being able to correlate noise and dust exposure is advantageous to those tasked with process improvement aimed at minimising exposure.

Casella Measurement's vision is one of an integrated bodily worn system that conceptually allows remote monitoring of relevant agents via a local network or indeed the internet.

This vision is shared, perhaps not surprisingly, by several in the global mining community but there are many integration challenges to be overcome not least power/battery requirements as well as the user interface (all of which tend to drive size and weight) plus wireless communication around the body and beyond. Trends in technology will deliver new chipsets and batteries that mean the vision will become a reality but "invent a better mousetrap and the world will beat a path to your door"[5], remains patently untrue. The key will be incisive technology roadmapping, innovative products inevitably emerging from the point in time where technology push meets marketing pull.

References

1. www.phaseto.com

2. Workplace Solutions, Safety & Health, (US) National Safety Council, Feb 2007

3. Handbook on Mine Occupational Hygiene Measurements, (SA) Mine Health & Safety Council, 2007

4. Comparison of task based estimates with full shift measurements of noise exposure, Seixas N, Sheppard L, Neitzel R, AIHA Journal, Nov/Dec 2003

5. Ralph Waldo Emerson (1803 – 1882)

Clearly, the same method used in a small engineering shop would not be relevant to a mining operation employing thousands of miners. Mining is a good, albeit extreme example, of simultaneous exposure to several agents i.e. gas, noise, vibration, (high) temperature & humidity. Major mining nations such as South Africa already have highly developed regimes for near continuous sampling of noise and dust exposure of so-called homogeneous employee groups (HEGS) to ensure statistical validity (as highlighted in the matrix). Interesting that the foreword to the