

AUTOMATION IMPROVES FUMIGATION EFFICIENCY

Telemetry is offering a more efficient and reliable method of monitoring fumigation gas concentrations **By Les Zeller**

THE CBH GROUP has literally hundreds of grain silos and storages located across Western Australia from Esperance to Geraldton. Ensuring the level of fumigation management is equal at all sites is a challenge. A new remote method of monitoring the concentration of phosphine gas being circulated in a store has been developed. This work is a collaboration between bulk handlers and the CRC for National Plant Biosecurity as part of the post-harvest integrity program. This system is currently being tested and should offer improved efficiency and accuracy.

Initially, the research team was approached to set up phosphine monitors that could be accessed directly via Bluetooth to a personal digital assistant (PDA). This step would have removed the need for data from the phosphine monitors to be gathered and recorded manually.

However, almost two years ago, it was proposed to develop a phosphine monitoring and recording system that utilises telemetry to access information about fumigant levels in grain storages via the internet. Using this method, data is automatically transferred to a central database that can be accessed in real-time from any location with internet access.

Engineer Paul Kamel completed the first phosphine monitoring system ahead of schedule, which is now installed in a large commercial storage at Tammin, Western Australia. A further three modules will be installed in Queensland, South Australia and NSW in early 2011.

The storage where this automated monitoring system is being tested consists of five silos. In addition a fumigant recirculation system is being trialled.

The fumigant gas within each silo is recirculated by switching valves and the fumigant is pumped from the bottom to the top of each silo. The recirculation system controls the operation of the fan and solenoid valves to recirculate the fumigant for each silo in turn.

The automated phosphine monitoring system is designed to gather information including temperature, humidity and the concentration of phosphine being recirculated and also references this data with the silo being recirculated. Between each sample the phosphine sensor is purged with clean air to ensure the integrity of each sample.

The single monitoring and recording system has been designed to be able to sample from up to 12 points, making the system cost effective even for large grain storages. Equally, a simplified system could be developed for on-farm grain stores.

Normally this data would be gathered manually every week, but with this system fumigation data can be gathered and recorded as often as every 10 minutes. If phosphine concentrations fall below a critical level the storage manager can identify this very rapidly.

Now the research needs to establish the expected useful life of the phosphine sensor currently being used and determine if it is sufficiently robust to carry out this intensity of reading. Options for further modifications to improve the efficiency of the system are also being investigated. □

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Paul Kamel (left) and Les Zeller on-site at Tammin, WA, with the telemetry equipment installed to relay data on phosphine concentrations directly to a central database.

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