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*Thirty-six CO Sensors, and associated Langan DataBear Measurers, are aligned around a source of CO in a vaulted living room of a suburban home. Wooden stands allow the positions to be changed quickly.*

## **A Field of CO (& CO Measurers)**

### **Bear Facts -- #94**

**A study of the dispersion of carbon monoxide in a large room of complex shape is underway to compare the mathematical model of air quality changes with those measured. Standard Langan CO Measurers, with additional CO sensor modules, are mounted to create a three-dimensional observation grid.**



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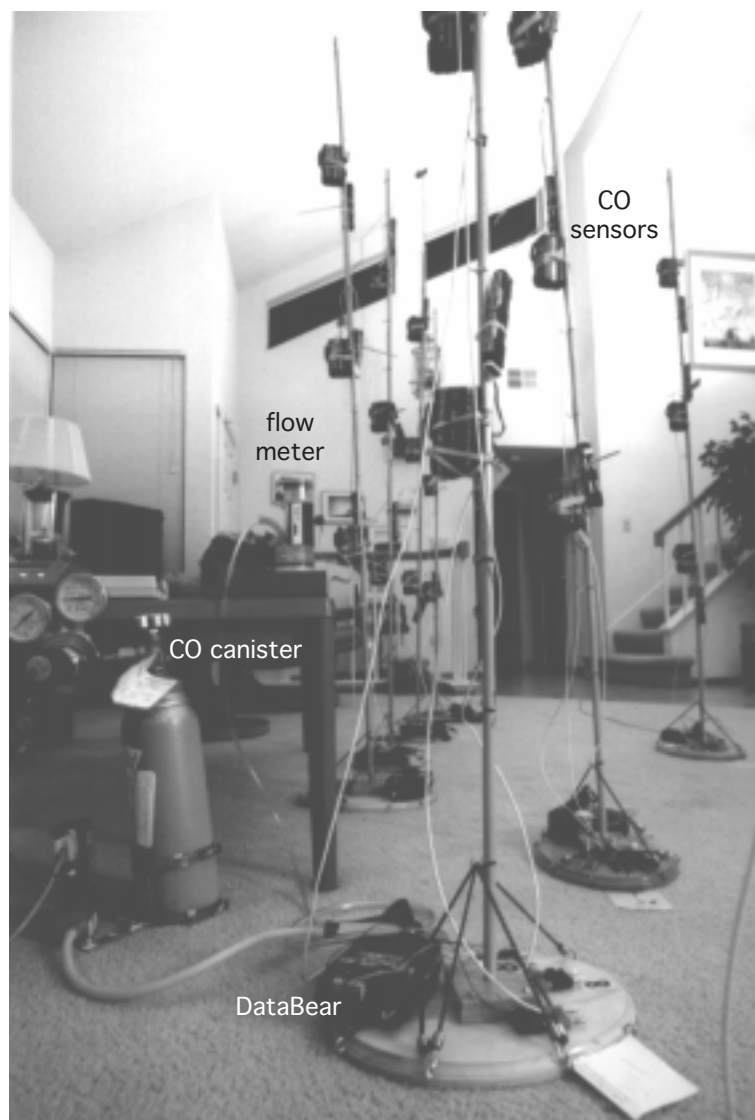


the DataBear

Bear Facts are published to provide useful insights into the operation and applications for the DataBear™ Measurer and associated complete instruments.

*Other parameters are also being used in the experiment.  
Respiratory particles sizes are observed at two points.  
SF<sub>6</sub> is used as a second point source reference at one point.*

*Tanks of pure CO are used as a 'point' source for testing the dispersion model.  
The rate of release is observed at a flow meter (on table).  
Several test stands are in place (during an actual experiment).  
Note that each data acquisition instrument supports several CO sensors.*




In the evaluation of indoor air quality, and more specifically the relationship of indoor concentrations to personal exposure, several factors must be assumed and calculated. Mathematical models have been developed to suggest the levels of degradation of air quality inside, which might result from smoking, for example. One question posed is: How accurate are these models under less-than-ideal conditions? Another: What is the impact on exposure? The Stanford University Environmental Engineering Department and Department of Statistics have undertaken a series of tests to assess these. The Langan CO Measurer was selected for the sensing instrumentation. The results will be published at a later date, but the first year's report is complete.

Mobile monitoring 'stands' were designed to hold the sensors at different vertical levels. This allows flexibility in designing the grid in which data can be gathered for several hours. Each stand consists of a portable data acquisition system (the DataBear) and up to four attached CO sensors with associated signal conditioning. The wiring is dressed around the support pole, and batteries are secured. With several stands, the measurement array can be modified quickly by placing each in a different place.

A canister of pure CO is set to release the gas at a constant flow. Data are gathered for a few hours and the array is changed. This cycle can be repeated over 8 to 10 hours. The DataBear can be attached by cable to a readout so the progress of the experiment can be observed in real time or verified when desired. The data from the day's acquisition can be downloaded at the end of the experiment. Measurements are usually measured every few seconds. Several hundred-thousand data points can be gathered in a day!

It is a daunting task to evaluate this volume of data, but the initial job is made easier with the statistical capabilities of the Sense-Your-World! software. Data condensation can be made immediately after retrieval.

This multi-year study is sponsored by the Center for Indoor Air Research, Linthicum, Maryland. 

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**The Langan CO Measurer combines a sophisticated, accurate electrochemical sensor in a small, tested configuration. These are attached to reliable data acquisition electronics and are retrieved by useful field-evaluated software. The miniature system has allowed students of air quality to expand their research in ways not previously practical (or readily affordable!)**

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