plan for air in as well as air out

We have received an increased number of enquiries over the past few months regarding HSE expectations with regards to air management calculations and enclosure design details within Plans of Work. These enquiries have been raised usually as a result of HSE comments received by members following site inspections or asbestos licence renewal assessments.

It is clear that as well as calculating how much air needs to be extracted from the enclosure, the HSE also wants to see the Plan of Work describe how the required volume of air will be allowed to enter the enclosure.

Allowing for the right amount of air to enter the enclosure is as important as ensuring the correct amount of air is extracted. If you haven't got the required amount of air entering the enclosure then you will not be extracting the required amount of air, even if the capacity of your negative pressure unit(s) suggests this.

For example, a well-sealed enclosure which requires 5,000m³/hr to be extracted to provide 8 air changes per hour, which has negative pressure units with a total capacity of 5,000m³/hr, and a standard size airlock and baglock which each have flap deflections between 200-300mm, and no other inlets for additional make up air, will probably only allow air extraction in the region of 3,000m³/hr. What can be extracted from the enclosure is limited by the amount of air which can physically be drawn into the enclosure.

When preparing Plans of Work, licence holders should consider how they are going to ensure sufficient make up air is permitted to enter the enclosure and how they are going to confirm the actual performance of the negative pressure units being used. *ARCA strongly recommends that the actual performance of negative pressure units on site is measured using an anemometer.*

Air Management

The specified level of air movement, or airflow, is 1,000m³/hr for small enclosures and at least 8 "air changes per hour" for larger enclosures. This has

been shown by HSE research to be the most reliable factor for good air management. Where this level of air movement is achieved, there is expected to be negative pressure of around minus 5 pascals, which represents good containment, thorough air mixing in the enclosure and, reduced exposure and spread of asbestos. It will also provide an easy method for determining that correct airflow exists, by using airlock door flaps as an indicator.

Planning

The first stage of planning air management for asbestos enclosures is to calculate the airflow required.

The effect of any ducting attached to the NPUs can be significant. As a "rule of thumb", ducting either side of the NPU, is likely to reduce flow by approximately 1% for each metre and 2% for each bend. Allowances for this need to be made in the calculation. For example, 10m of ducting will reduce the airflow of an NPU by approximately 10%, and 10m of ducting with two bends will reduce the airflow of an NPU by approximately 14%.

If there are any voids within the enclosure which will be opened up as the work progresses, the planning will need to consider these, and consider how the airflow will be increased to take account of the increase in enclosure volume and continue to maintain good air management.

In a well-sealed enclosure, the volume of air pulled out must be equal to the volume of air allowed in. In other words, where an enclosure has a series of NPUs intended to move 10,000m^3/hr of air, it must be designed to allow 10,000m^3/hr in. You will need to ensure that allowance has been made for sufficient make up air to enter the enclosure. The smoke test should confirm that the enclosure is well sealed. You should not rely upon a 'leaky' enclosure to supply make up air.

For planning purposes, NPUs should be referred to by their last known ***actual*** rating rather than the manufacturer's nominal rating. Standard units of measurement should be used throughout the organisation to minimise confusion: i.e., m^3/hr.

The planned air management system for an asbestos removal enclosure should be sufficiently detailed in the Plan of Work to enable the supervisor to set it up as required, and to test it to ensure it is effective and performing as anticipated.

1,000m^3/hr of airflow through an airlock will deflect a 'standard' door flap around 200mm. At 1,500m^3/hr, the amount of deflection, around 300mm, starts to restrict the space available for decontamination in the 'minimum' 1m square stage. These airlock flap deflections will be consistent for consistent flow rates regardless of enclosure size.

Standard Airlocks and Baglocks

To provide consistency to their approach, licensed asbestos removal contractors should adopt the standard sizes of airlock and air chambers identified by the HSE. Therefore, airlock and baglock door openings should be 0.7m x 1.7m, giving an aperture with an area of 1.19m^2.

The width and weight of the flaps are important. Wider, heavier flaps will offer more resistance to air.