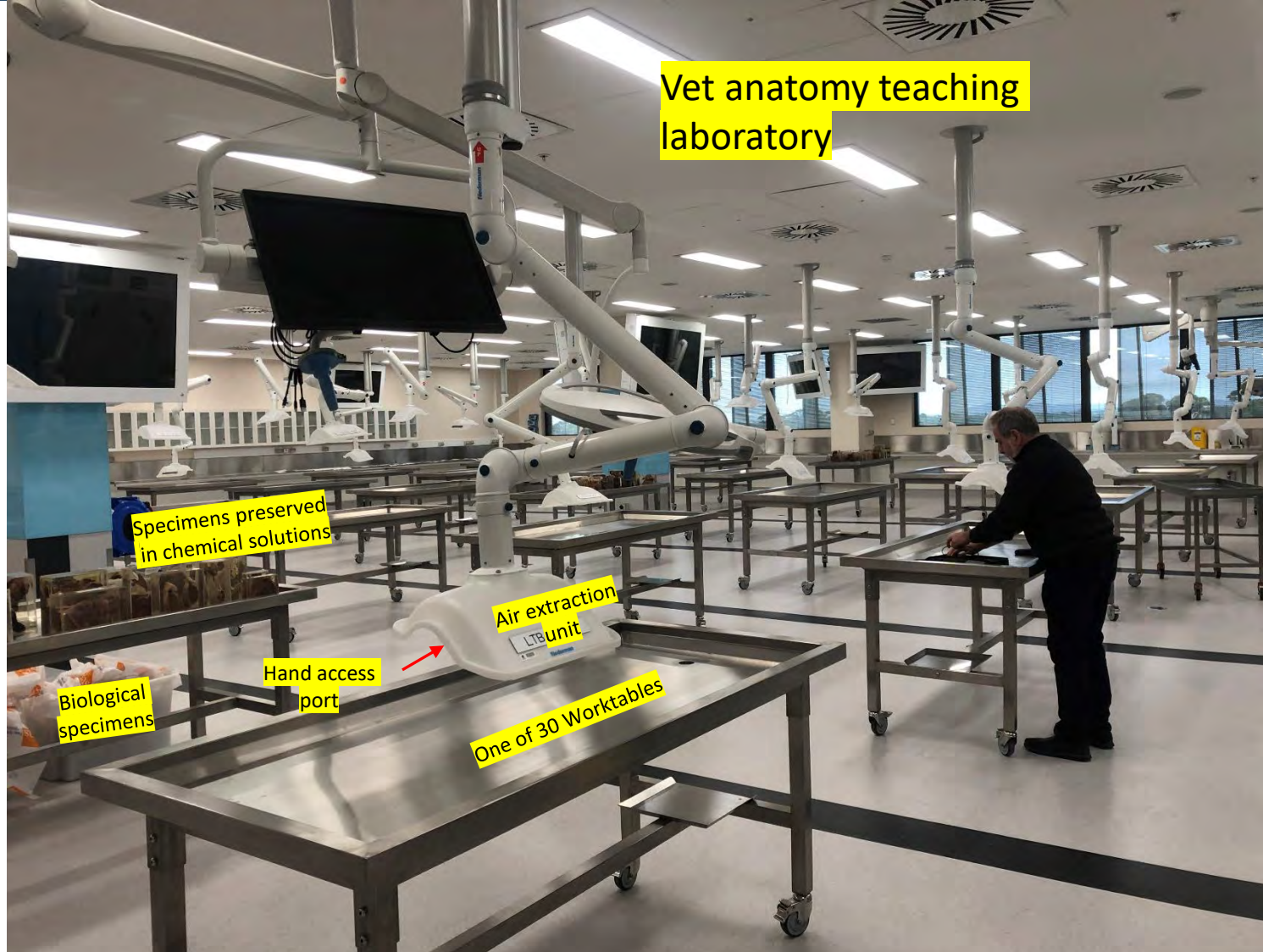




An introduction to Occupational Hygiene

What is an Occupational Hygienist, and what do we do?

To illustrate the point of how a hygienist works, I will take you for a brief walk through two Laboratories where you get to be the hygienists and answer the questions.



Vet anatomy teaching laboratory

Specimens preserved in chemical solutions

Biological specimens

Hand access port

Air extraction LTB unit

One of 30 Worktables

Formaldehyde
CAS number:50-00-0
Chemical formula:H₂CO
TWA: 0.1 ppm (0.12 mg/m³)
STEL: 0.3 ppm (0.37 mg/m³)

Biological issues
Anthrax.
Avian influenza.
Brucellosis.
Hantavirus.
Hendra virus.
Leptospirosis.
Bat Lyssavirus
Q-fever



You have 4 hours to examine the laboratory and make recommendations

(Time is money and the client is not made of gold)

An idea would be to measure the extraction unit to see if it's working to an appropriate level?



Is this extraction hood working for the student or against them?



Hand access point

Do you think a transparent hood would be a better option?



Transparent hood

Hand access point



The client said they engaged design architects to put the system together.

My thoughts on the matter, architects normally deal with qualitative aspects of the design, eg, how does the finished aspect look. If they are dealing with the system of work; maybe, they should have engaged a hygienist.



Nederman states:

Particular attention needs to be paid to the exhaust fans selection when other ancillary equipment is on a common exhaust system.



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The second laboratory has an interesting issue:





RED LEAD

Lead(II,IV) oxide – Pb_2O_4



Workplace exposure standard (TWA) = **0.05 mg/m³**

Remembering Formaldehyde (TWA) = **0.1 mg/m³**



Requires a registered medical practitioner supervising the health monitoring program.



Storage issues!



Environmental issues!





Ventilation

- We have recently had a spate of COVID infections in our office. We would like to confirm whether our ventilation is adequate for the current pandemic. Is our ventilation system adequate?





Our Approach

- Discuss requirements with key stakeholders
 - Inspect office area
 - Review mechanical ventilation system
 - Assess air handling units (AHU)
 - Undertake air flow / ventilation assessment
 - Review against current standards and guidelines
-





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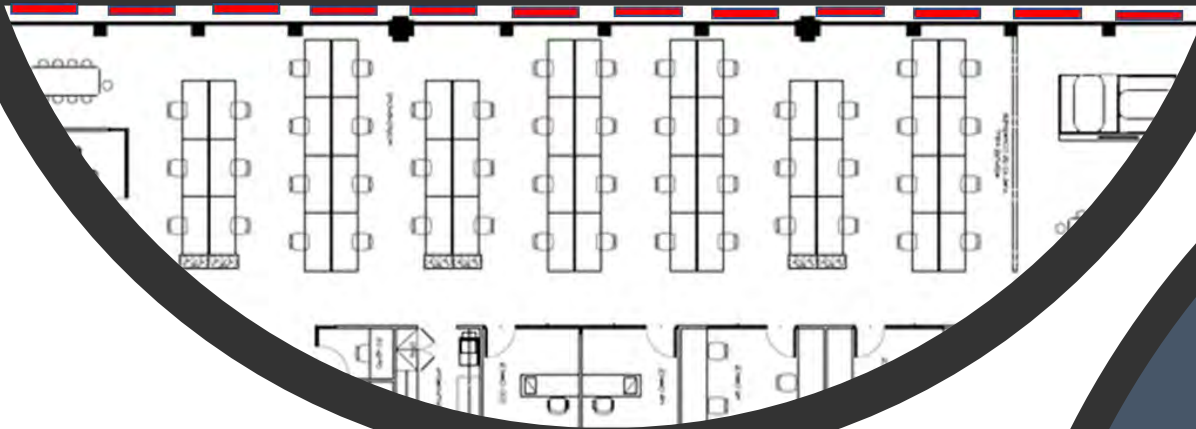


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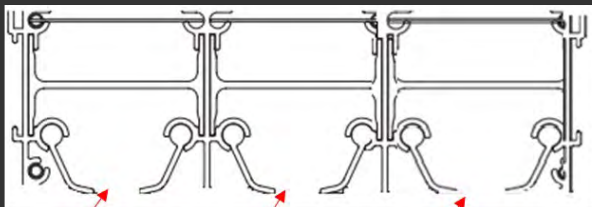
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Slotted Linear Diffusers (SLD) positioned around the perimeter of the office



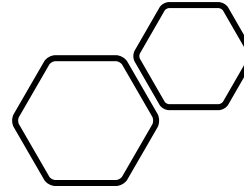
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Case Study



What We Know



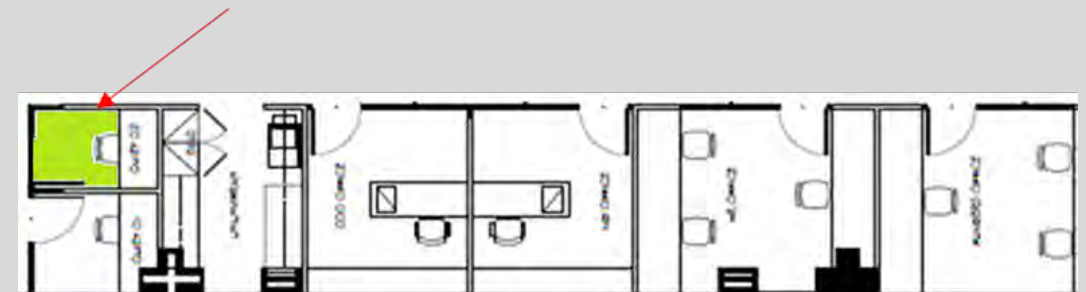
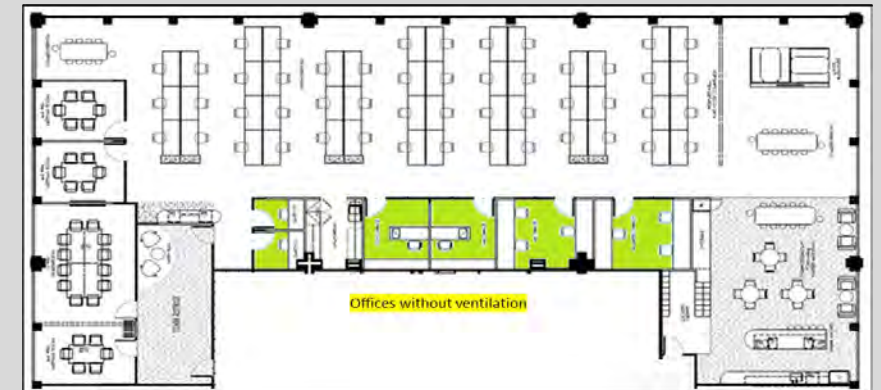
- Multi storey commercial building
- Approximately 30 to 50 persons occupying floor space
- A number of staff have been infected with COVID-19
- There is a fulltime facility manager maintaining the building
- The air handling units are used across tenancies
- AS1668.2 2012 – requirements
- National Construction Code (NCC) Handbook requirements 2021 – Indoor air quality
- ASHRAE 62.1 Ventilation for acceptable air quality 2021

AS 1668.2 - 2012 Appendix A.		
Offices	m ²	per person
Art rooms	5	10 L/s.
Board rooms	1	10 L/s.
Committee rooms	1	10 L/s.
Computer rooms	25	10 L/s.
Conference rooms	25	10 L/s.
Drafting rooms	5	10 L/s.
Office areas	10	10 L/s.
Waiting areas	2	10 L/s.



What we Found

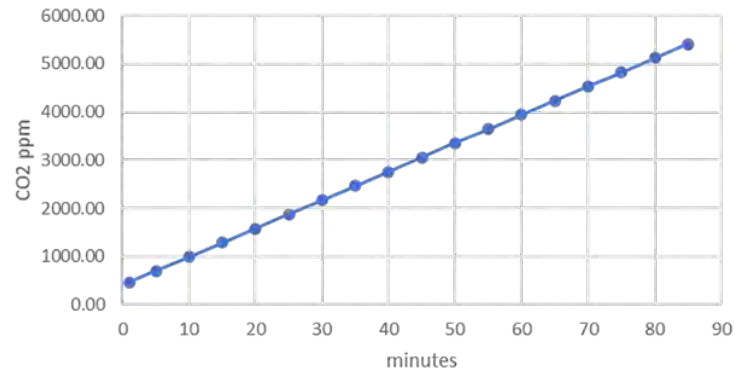
- Poor ventilation in various office and break out areas
- Meets AS1668.2 requirements for air quantity
- Does not meet ASHRAE 62.1 ventilation requirements
- Does Not meet NCC ventilation requirements
- There is a difference between air quantity and air quality observed by various standards



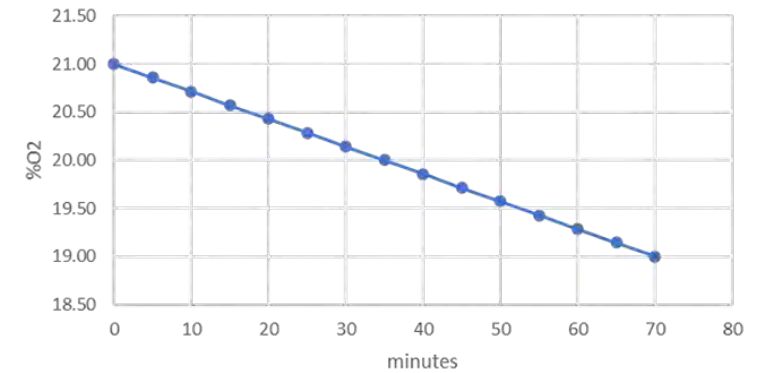


Modelling our findings

Carbon dioxide level in the office



Oxygen level in the office



ASHRAE 62.1 – dealing with Covid-19	
Location	Suggested ACPH
Offices	2-3
Schools	5-6
Restaurants	6-8

CO2 trigger point= level Averaged over an 8-hour day = 850ppm

Table 4.1 Various CO₂ level limits and recommendations

Comments	CO ₂ concentration (ppm)
Australian occupational exposure limit (SWA 2011b)	5000
ASHRAE 62.1 recommendation (occupant comfort)	1000
AS 1668.2 recommendation (for CO2 controlled ventilation)	800 - 600
NCC IAQ Verification Method (as an indicator for body odour)	850
Typical outdoor air range	400 - 300



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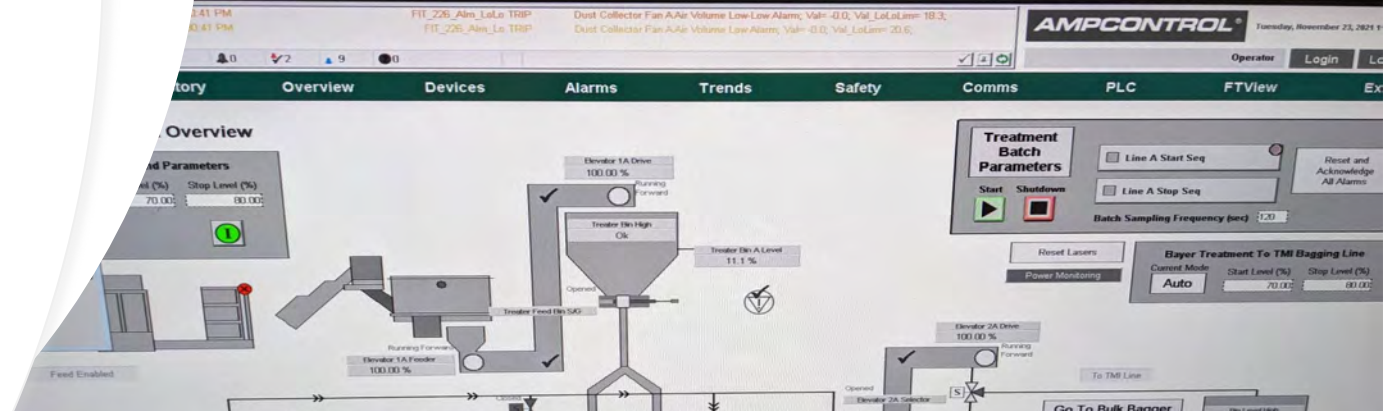
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GLOBAL



Case Study 2





Facts

- ✓ Production line environment
- ✓ Approximately 30 workers
- ✓ Use of insecticides to control fungal and microbial growth - TriPlus
- ✓ Recent experiences of headaches, nausea and other such symptoms amongst workers

The Environment

- ✓ Large warehouse type process
- ✓ Natural ventilation
- ✓ Some extraction
- ✓ Personal protection used – disposable overalls, P2 masks and nitrile gloves



Fluency Agitator



Treaters



Drying tables



SDS - TriPlus

- Various areas to review
- Composition/Information on ingredients
- Toxicology
- Hazards Identification – Hazard statements
- Exposure controls



Product Name: TriPlus Insecticidal Seed Treatment
Page 1 of 8
Issued: 11 July 2017

Section 1 – Identification of The Material and Supplier

Australis Crop Protection Pty Ltd		Phone 0417 329 133 (all hours)	
Shop 4, 30 Heber Street		Fax 3337 9882	
Moree, NSW 2400			
Chemical Nature:	Multi active ingredient insecticidal seed treatment.		
Trade name:	TriPlus Insecticidal Seed Treatment.		
APVMA Code:	Not registered – experimental insecticide.		
Product use:	Insecticidal seed treatment for cotton as per the label.		
Creation date:	11 July 2017		
This version issued:	July 2017		

Section 2 – Hazards Identification

Statement of Hazardous nature
This product is classified as: Hazardous according to Safe Work Australia (SWA).
Not subjected to the ADG code when transported in Australia by Road or Rail in packages 500 kg (L) or less; or in IBC's (refer to SP AU01). However if transported by Air or Sea, this provision does not apply. Then the product is classed as Dangerous (Class 9 Environmentally Hazardous) by IATA and IMDG respectively. See details below and in Section 14 of this SDS.

Globally Harmonised System (GHS) classification of the substance/mixture:
Acute Toxicity – Oral – Hazard Category 4.
Hazardous to the Aquatic Environment – Long term hazard: Hazard Category 2.

Signal Word: WARNING.

Hazard Statements:
H302 Harmful if swallowed.
H410 Toxic to Aquatic life with long lasting effects.

Precautionary statements:
Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash hands, arms and face thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P281 Use personal protective equipment as required.

Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if feel unwell.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P330 Rinse mouth.

Product Name: TriPlus Insecticidal Seed Treatment
Page 2 of 6
Issued: 11 July 2017

Major Health Hazards: Product is harmful if swallowed. Thiodicarb is an anti-cholinesterase compound. Symptoms of acute exposure to cholinesterase-inhibiting compounds may include the following: numbness, tingling sensations, incoordination, headache, dizziness, tremor, nausea, abdominal cramps, sweating, blurred vision, difficulty breathing or respiratory depression, and slow heartbeat. Very high doses may result in unconsciousness, incontinence, and convulsions or fatality.

Section 3 – Composition/Information on Ingredients

Ingredients:	CAS NUMBER	PROPORTION
CHEMICAL		
Imidacloprid	138261-41-3	350 g/L
Thiodicarb	59669-26-0	250 g/L
Fipronil	120068-37-3	50 g/L
Other ingredients determined not to be hazardous		Balance



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What we Found

- Poor extraction along the drying table
- Only natural ventilation for the dilution of contaminants
- TriPlus was major cause to the health impacts of workers
- PPE not sufficiently adequate
- Decontamination procedure not adequate
- Work practices contributing to exposure of dusts, fumes or vapour

