How can Practitioners know when Faecal Waste is NOT Safe?

Mark Ellery, Consultant
Bronwyn Powell, Knowledge & Learning Manager

CS WASH Fund
Australia
Shifts in the Sanitation SDG 6.2

**Millennium Development Goals (MDGs)**

- **Improved**
  - Halving those without access
  - Improved facilities are not necessarily safe
  - Add a ‘safely managed’ category
  - Paying special attention to the needs of women and girls
  - Target the universal access to sanitation and the progressive elimination of all inequalities

- **Shared**
  - Access is biased against the hard to reach (i.e. the poor & disabled)
  - Shared facilities are not necessarily unsafe

- **Other unimproved**
  - No targets for open defecation

- **Open defecation**
  - No service

**Sustainable Development Goals (SDGs)**

- **Safely managed**
  - Safely contain, empty, dispose & treat excreta. Handwashing with soap & water

- **Basic**
  - Eradicate all open defecation by 2025

- **Limited**

- **Other unimproved**
Faecal waste is comprised of sludge and effluent.

For faecal waste to be safe, then the ...
- faecal sludge must (at least) be dry
- faecal liquid must (at least) be clear

Why?
Minimum Conditions for Faecal Waste to be Safe

Hypothesis:
Faecal waste is most efficiently digested by anaerobic (no air) + aerobic (with air) processes because:

• **Aerobic digestion**: is more efficient in reducing pathogens (i.e. faecal bacteria & viruses) → Public Health
• **Anaerobic digestion**: is more efficient in reducing solids (incl. BoD, nitrogen & phosphorous) → Environmental Health

Aerobic processes reduce pathogens when:
- solids have been removed from liquids
- liquids have been removed from solids
Can you identify the aerobic & anaerobic zones in the following technology options?
1. Waste Stabilization Ponds

- **Settling Pond**
  - Anaerobic (1-7 days)

- **Facultative Pond**
  - Aerobic (5-30 days)

- **Maturation Pond**
  - Aerobic (15 – 20 days)

2. Septic Tank & Leach Pit

- **Anaerobic**
  - Scum
  - Effluent
  - Sludge

- **Aerobic**
  - Effluent
5. Direct Pit

6. Dry Pit

7. Urine Diverting
Rural Faecal Waste Containment Options

Faecal sludge & effluent are most efficiently digested by both anaerobic (with no air) + aerobic (with air) processes

**Anaerobic digestion:**
- More efficient in reducing solids (incl. nitrogen & phosphorous) → Environmental Health

**Aerobic digestion:**
- More efficient in reducing pathogens (i.e. faecal bacteria & viruses) → Public Health

### Septic Tank & Leach Pit
- A septic tank without a leach pit will discharge both faecal effluent & sludge to drains
- Septic tanks lose the retention time to treat effluent if they are not routinely pumped out

### Anaerobic chambers only require a vent pipe if they aren’t linked to an aerobic process and if latrine water won’t flush

### The use of three sets of rings can significantly reduce the costs of a septic tank for high loads

### Handle faecal waste with care

- Switched pit will shift from anaerobic to aerobic

### Faecal waste is safe if left for 1 year

### Live pit is anaerobic so pathogen content is high

### Hard to empty faecal waste with care
- Superstructure makes it difficult to empty

### Anaerobic process is most effective when:
- solids have been removed from liquids
- liquids have been removed from solids

### Faecal waste is safe if dry

### Water kills aerobic bacteria = unsafe