

A tractor is pulling a large, orange, cylindrical manure tank in a field. The tank has the word "REITER" written on it. The tractor is moving through a field of dark, tilled soil. In the background, there are green crops and a clear sky.

Manure application

- Equipment types
- Calibration
- Costs
- Environmental concerns



Umbilical hose applicator

IOWA STATE UNIVERSITY
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Equipment types

Solid or semi-solid material

Box

Flail

Slinger

Liquid material

Tank

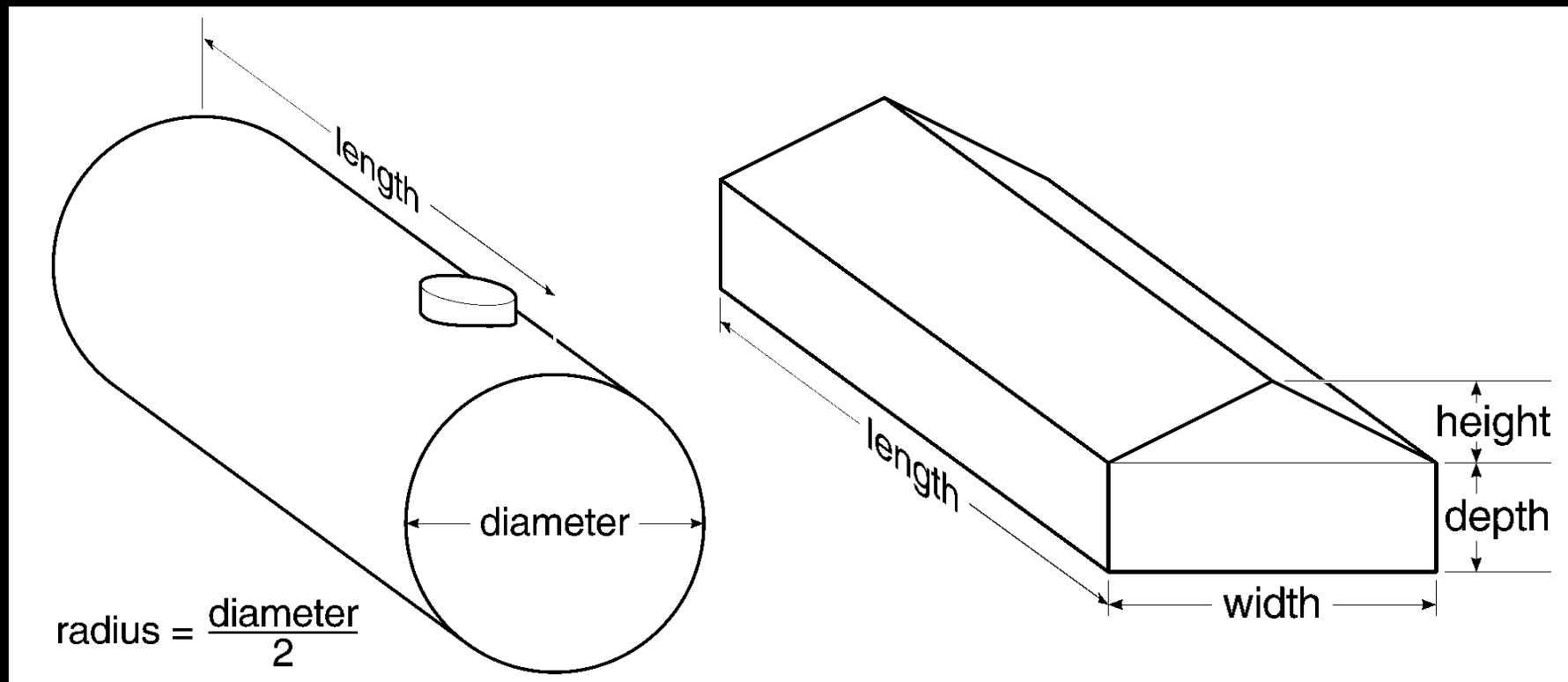
Umbilical hose

Irrigation

Spreader capacity

Weighing loaded applicator is preferred

Volume calculation can be used



Calibration

Application rate =

$$\frac{\text{Spreader capacity} \times \text{No. of loads}}{\text{Land area}}$$

Calibration example

A full 6000 gallon applicator is emptied in a 15 ft wide swath over a distance of 4356 feet. What is the application rate?

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$$\text{Land area} = \frac{\text{length, ft} \times \text{width, ft}}{43,560 \text{ sq ft/ac}} = \frac{4356 \times 15}{43,560} = 1.5 \text{ ac}$$

$$\text{Application rate} = \frac{6000 \text{ gal/ld} \times 1 \text{ ld}}{1.5 \text{ ac}} = 4000 \text{ gal/ac}$$

Changing application rates

- Ground speed
- Swath width
- Unloading rate

Costs

Ownership costs

Fixed

- Depreciation
- Interest/opportunity
- Insurance and housing

Variable

- Repair and maintenance
- Tractor use
- Fuel
- Labor

Costs cont.

- Components of costs can be calculated from:
 - Machine usage
 - Purchase price
 - Tractor requirements
 - Local labor, fuel, & interest costs
- Ownership costs can be compared with:
 - Custom application costs
 - Rental equipment costs
 - Joint ownership costs

Environmental concerns

- Odor
- Public perception
- Application timing
- Soil compaction
- Avoid land near surface water
- Surface residue burial