

Seed Treating Equipment

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Seed Treating Equipment

- The application of seed treatment materials is a specialized operation and is usually the last step in seed processing.
- Treatment materials are applied as dusts, slurries, or liquids.
- The equipment used to apply chemicals to seed are classed as seed treaters and the design can be divided into *Continuous Treating* and *Batch Treating*.



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The basis of selecting treatment materials, and characteristics of treatment materials will not be discussed here, it is beyond the scope of this class.

Seed Treating Equipment - Treatment

- Common Seed Treatment Products:

- Fungicides

- Insecticides

- Nematicides

- Avicides



- Polymers

- Inoculants

- Colorants

- Others?

- Chemical Forms

- Powder (Dust)

- Slurry (Suspension)

- Liquid film coating

**** Treated seed MUST be colored and labeled to distinguish it from seed intended for human or animal consumption!!**

Seed Treating Equipment – Safety

- Protective Gloves – Chemicals
 - Minimum 14 mil Thickness
 - DO NOT USE disposable Latex gloves
- Goggles – Splash & Dust Protection
 - Standard safety glasses are NOT adequate
- Face Shield – Eye & Face Protection
 - Typically used in addition to goggles
- Respirator
 - Must be rated for chemical type in use
 - Periodic fit test and employee physicals may be required for many applications



Seed Treating Equipment – Designs

- Continuous Flow System:
 - Apply treatment at a predefined rate to the *continuous* flow of seed.
 - High capacity.
 - Low to medium application rates.
 - Single treatment chemical layer.



- Batch System:
 - It delivers a predetermined *batch* size into a mixing chamber.
 - Low capacity.
 - High chemical application rates.
 - Flexible – multiple chemical layers.



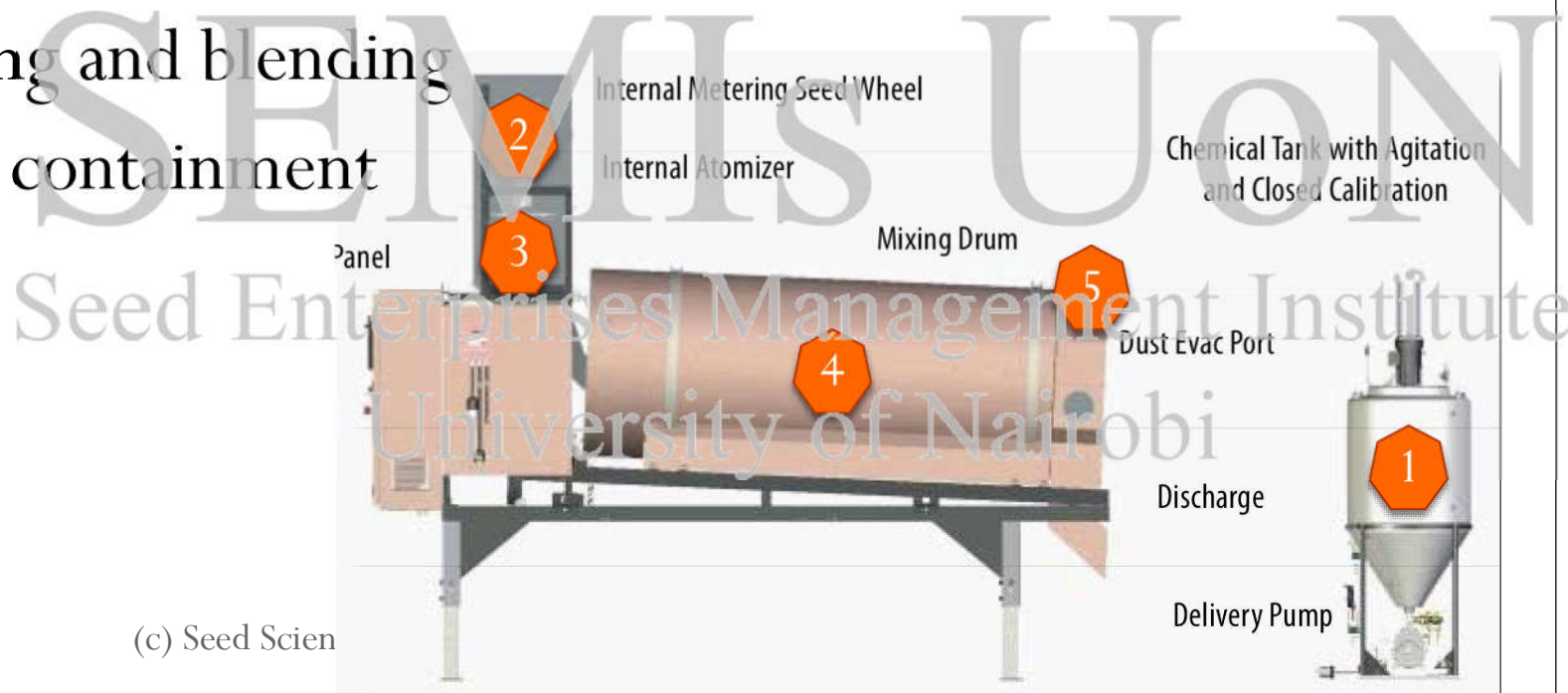
Open System



Closed System

Seed Treating Equipment – Elements

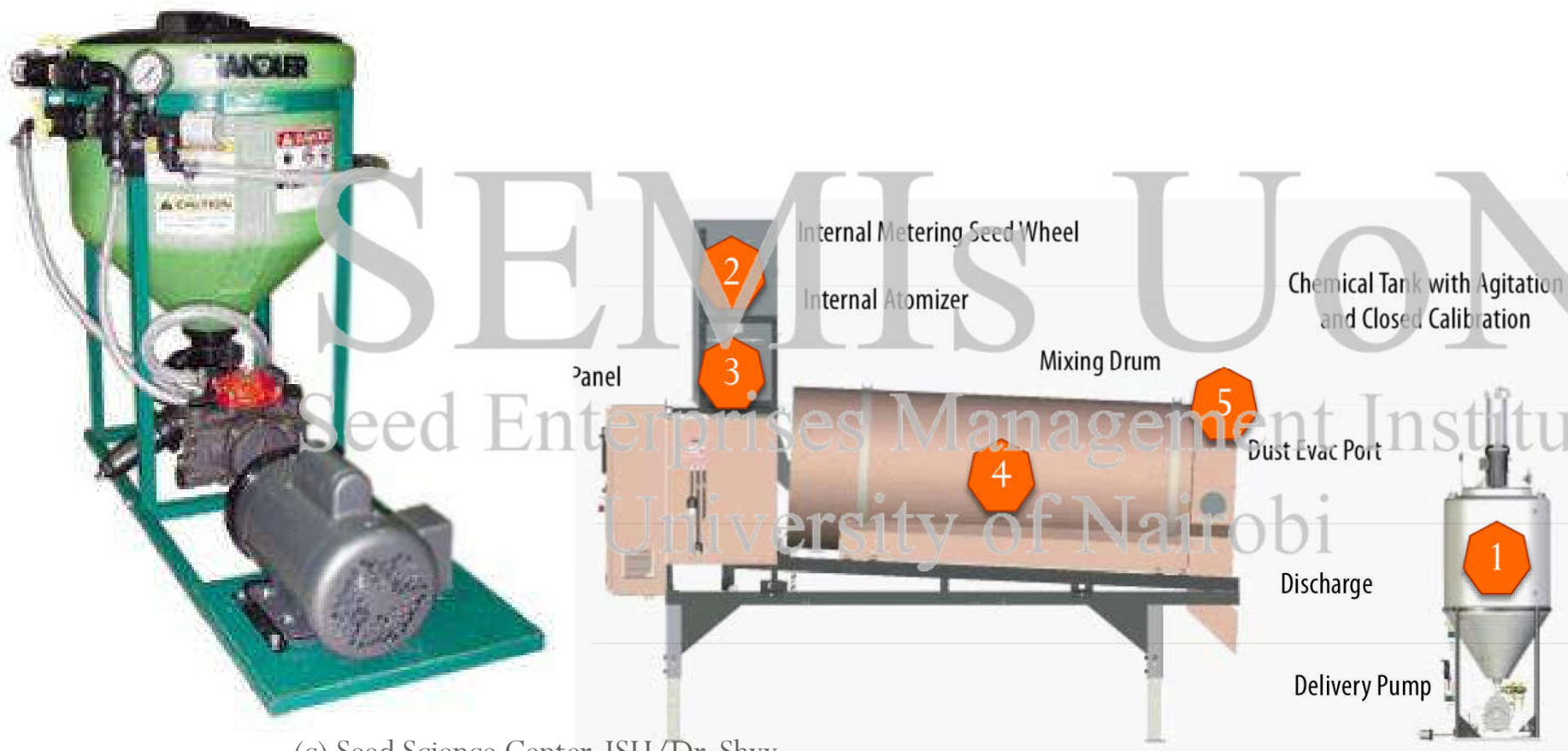
- A closed treating system, batch or continuous, consist of five process elements:
 1. Storage and transfer
 2. Delivery and metering of seed
 3. Delivery and application of treatment
 4. Mixing and blending
 5. Dust containment



(c) Seed Scien

Seed Treating Equipment – Elements

- 1. Storage and transfer:
 - Seed – Holding bin
 - Chemical – Bulk container, transfer pump, and mixing tank




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Seed Treating Equipment – Elements

- 2. Delivery and metering of seed:

Seed Metering Systems



The image displays three different seed metering systems. On the left is a gravity-operated weigh pan system with an adjustable counterweight arm. In the center is a volumetric rotating seed wheel system. On the right is a computerized inline or belt scale system. A diagram below the right image shows the flow of seed through a hopper and into a metering device.

Weight

Volume

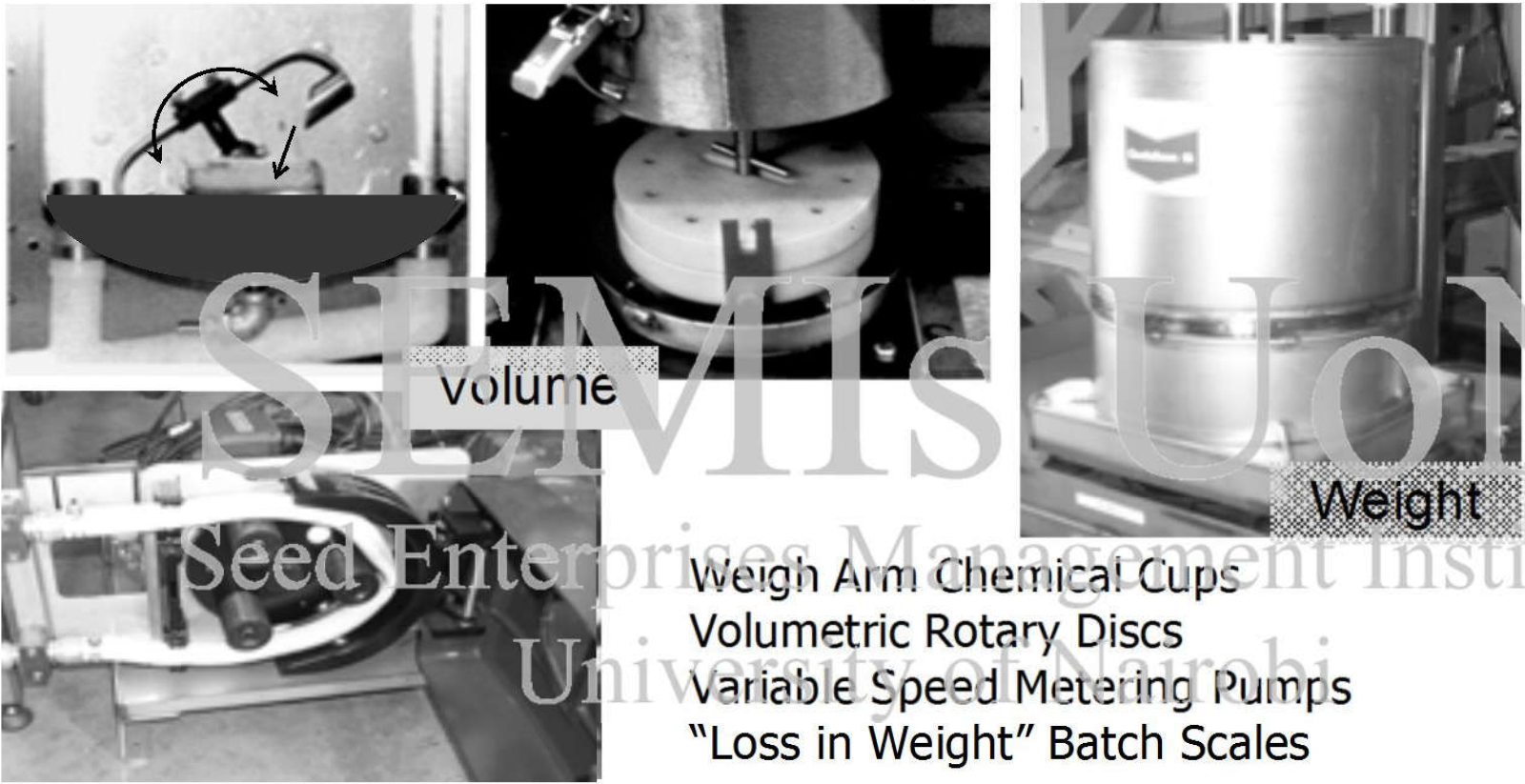
Gravity Operated Weigh Pans with Adjustable Counterweight Arm
Computerized Inline or Belt Scales
Volumetric Rotating Seed Wheel

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Seed Treating Equipment – Element

- 3. Delivery and application of treatment:

Chemical Metering Systems



The image displays four different chemical metering systems used in seed treatment. The top-left image shows a rotary disc system with a curved arrow indicating rotation. The top-right image shows a volumetric rotary disc system with a central shaft and disc. The bottom-left image shows a variable speed metering pump with a cylindrical tank and a pump mechanism. The bottom-right image shows a 'loss in weight' batch scale with a large cylindrical tank and a weighing mechanism. The text 'Volume' is overlaid on the top-left image, and 'Weight' is overlaid on the bottom-right image.

Volume

Weight

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Weigh Arm Chemical Cups
Volumetric Rotary Discs
Variable Speed Metering Pumps
"Loss in Weight" Batch Scales

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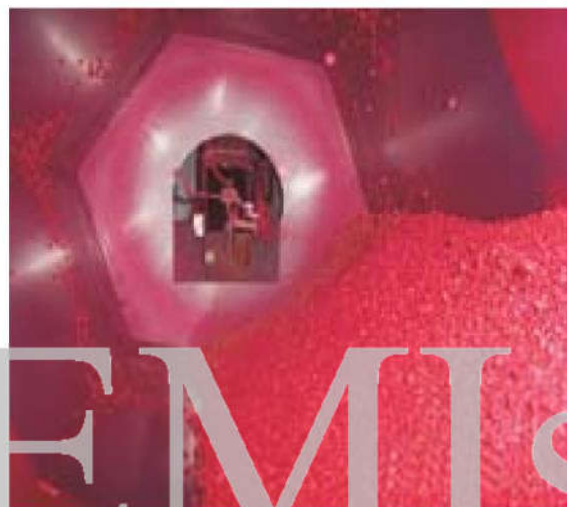
(c) Seed Science Center, ISU/Dr. Shyy

Seed Treating Equipment – Element

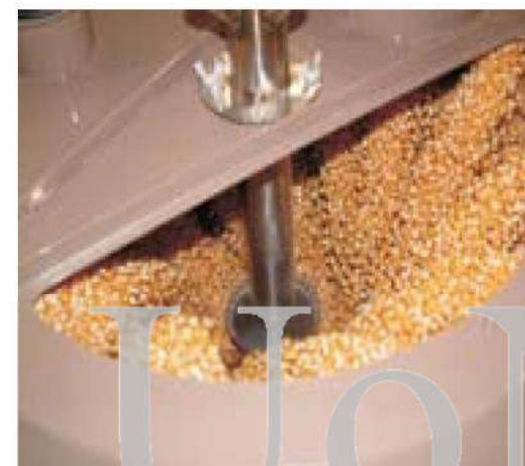
- 4. Mixing and blending:



Mixing Drum
(shown with treating head)



Mixing Drum
(view inside drum)



Mixing Bowl
(shown inside CBT Bowl)

- Primary Mixing: Direct application to seed
- Secondary Mixing: Seed contact transfer, blending action effects
- Drying and absorption: Ambient or artificial drying equipment

Seed Treating Equipment – Element

- 5. Dust containment:



Weigh Arm Calibration Example

- ❑ Label Rate Range: 10-12 Fluid Oz/Cwt
- ❑ Converted Range: 296-355.2 CC/Cwt
- ❑ Trip Count for 100 lbs = 20 Trips/Cwt

❑ Seed/trip:
$$\frac{100 \text{ Lb}}{1 \text{ Cwt}} \times \frac{1 \text{ Cwt}}{20 \text{ Trip}} = \frac{5 \text{ Lb}}{\text{Trip}}$$

❑ Cup Size:
$$\frac{296 \text{ CC}}{1 \text{ Cwt}} \times \frac{1 \text{ Cwt}}{20 \text{ Trip}} = \frac{14.8 \text{ CC}}{\text{Trip}}$$

$$\frac{355.2 \text{ CC}}{1 \text{ Cwt}} \times \frac{1 \text{ Cwt}}{20 \text{ Trip}} = \frac{17.8 \text{ CC}}{\text{Trip}}$$

- ❑ Chemical Cup Size: 15 CC/Cup



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❑ Images courtesy of Gustafson (BCS)

Seed Treating Equipment – On Farm

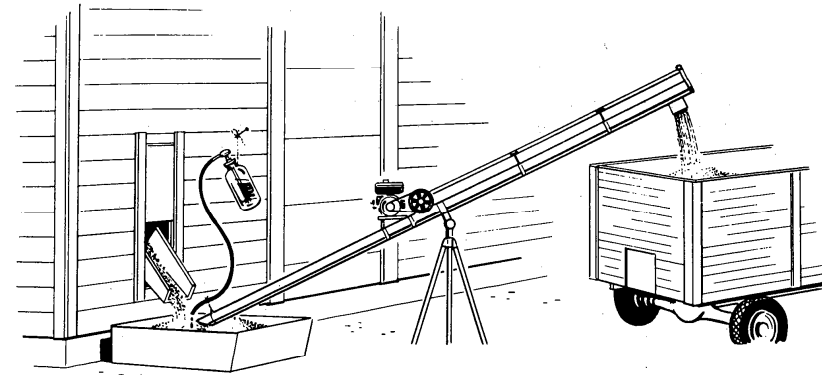


Figure J6. The application of seed treatment during conveying of seed.

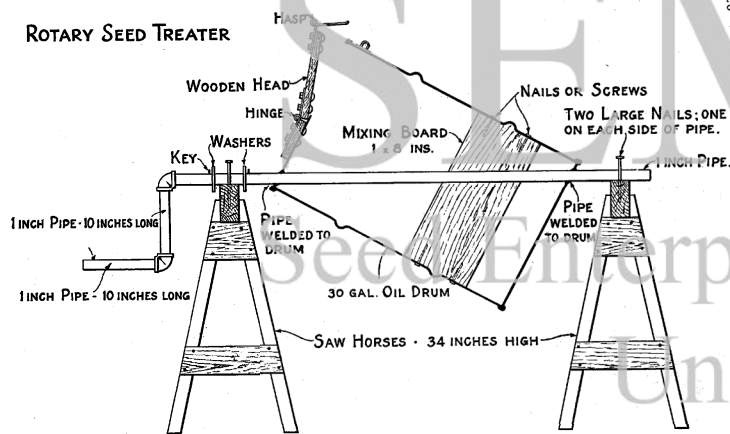


Figure J5. On-the-farm rotary seed treater used to apply seed treatment materials.



Figure J7. A small cement mixer can be used as a seed treater.



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