



SILO CLEANING AND MAINTENANCE 101

Education Presentation Presented By:

Dennis Blausen - CEO

USA SILO SERVICE, INC - ABOUT US.

- The Nation's Most Capable And Efficient Silo Cleaning and Maintenance Firm
- Started Silo Cleaning In 1990
- Starter Air Pad Maintenance In 1992
- Clean Concrete Domes and Pad Maintenance.
- Started Coating Applications In 2002
- No On Job Time Incidents Since 1990
- Coverage Of The Entire United States
- Crews Trained To Both OSHA & MSHA
- A Part Of The Marietta Silos Group



USA SILO SERVICE - INDUSTRIES SERVED

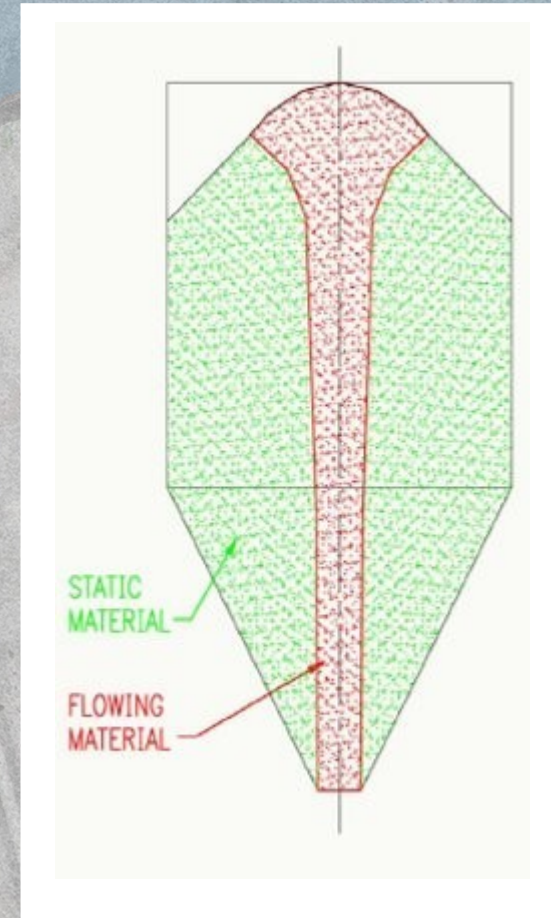
- Cement
- Coal
- Fly and Bottom Ash
- Glass
- Clays
- Grain
- Food Grade Materials
- Other Raw Materials

SILO FLOW PATTERNS

- Different Stored Materials Behave And Flow Differently In Silos
- **Types of Flow**
- Funnel Flow
- Mass Flow
- Fluidized Flow

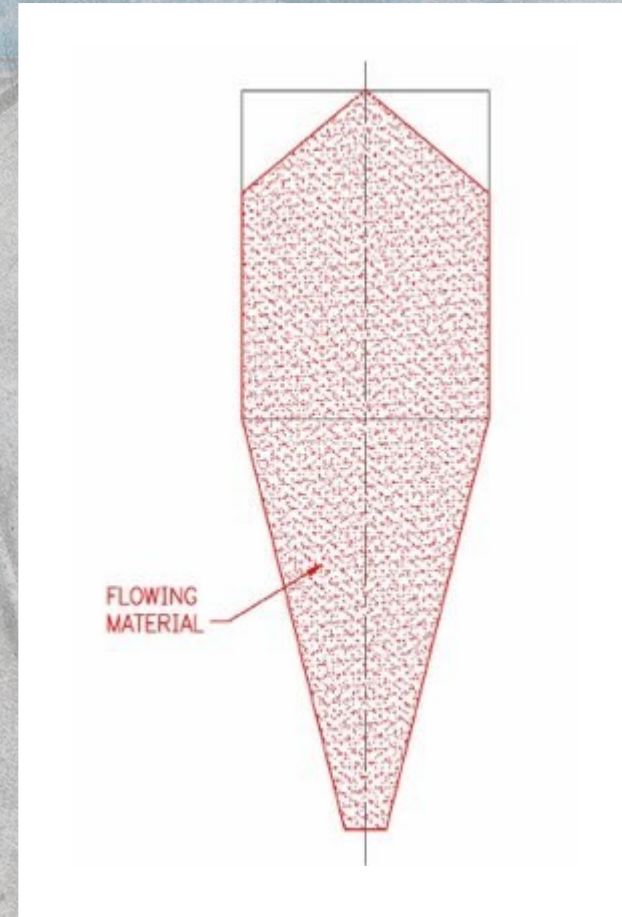
FUNNEL FLOW SILOS

- For More Granular Type of Product
- Flow Channel in Middle
- Cone Angles 45 – 60°
- Subject to Asymmetric Flow and Rat Holes
- 20-30% less Expensive Than Mass Flow



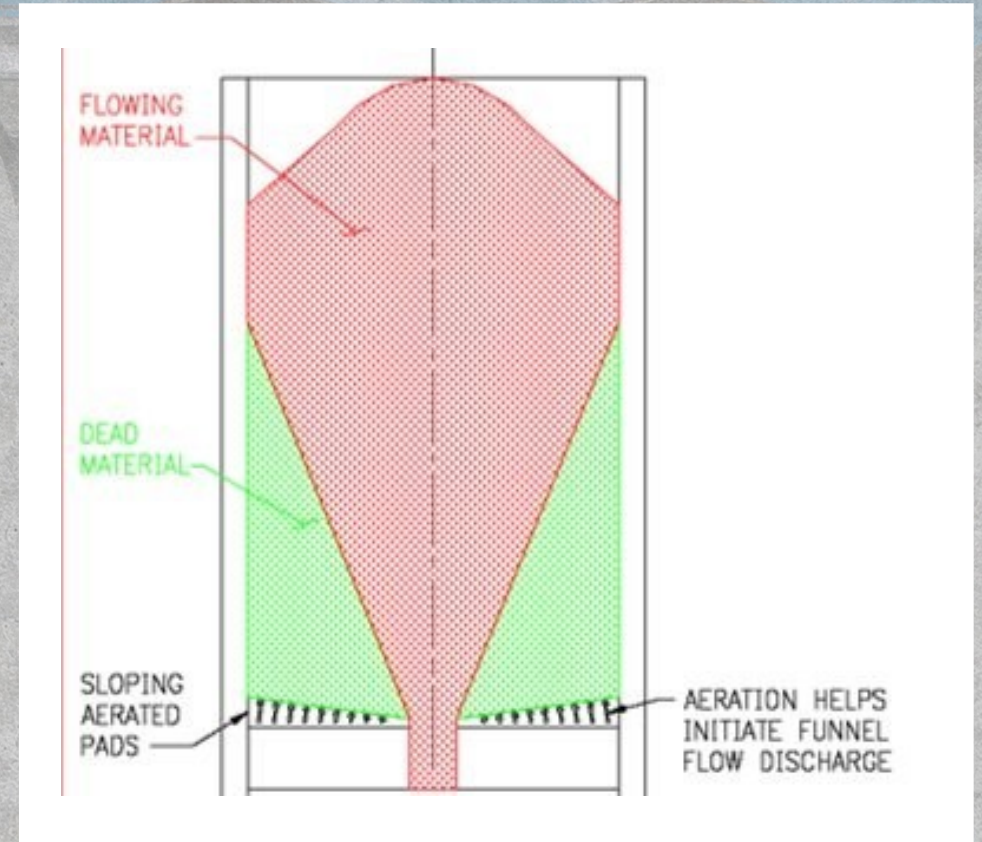
MASS FLOW SILOS

- For Coal or Other Materials with Segregation Problems
- Material Moves as a Column
- No Flow Channels – Eliminates Stagnant Materials
- Removes Possibility of Spontaneous Combustion
- Cone angles 68 – 72°



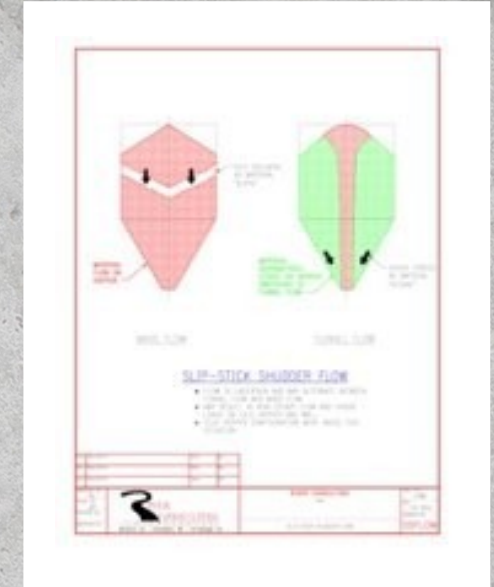
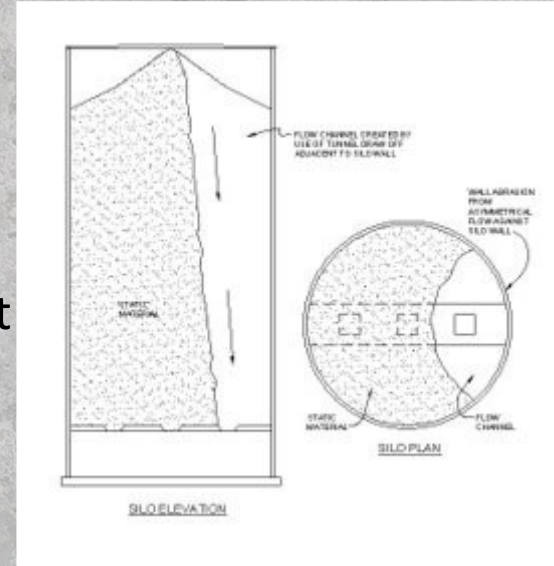
FLUIDIZED FLOW SILOS

- For fine powders
- Material is aerated
- Material comes down evenly like a fluid
- Cone angles 5 – 10°



AVOID! ASYMMETRICAL FLOW & SHUTTLE FLOW

- Asymmetric flow of stored material in a funnel flow silo is extremely dangerous.
- Shuttle flow is when material is confused and try's to flow as both funnel and mass flow
- Silo wall bending & tremendous vibrations that can destroy a silo
- A Flow Study will provide you with design parameters
- Cost approximately \$10k and adds about 1 month to project timeline



MATERIAL BUILDUPS AND BLOCKAGES ARE DETRIMENTAL TO SILOS

- Lower silo storage capacity
- Lead to silo additional blockages
- Causes material flow issues
- Disrupt operations and cause down time
- Can lead to silo damage and collapse



SILO CLEANING 101

Types of Material Blockages and Buildups in Silos



BRIDGING



CAKING



DOMING



FUNNELING



PLUGGING



RAT HOLING

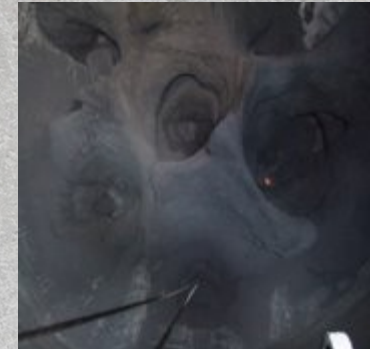


WALL BUILD-UP
OR SCALING



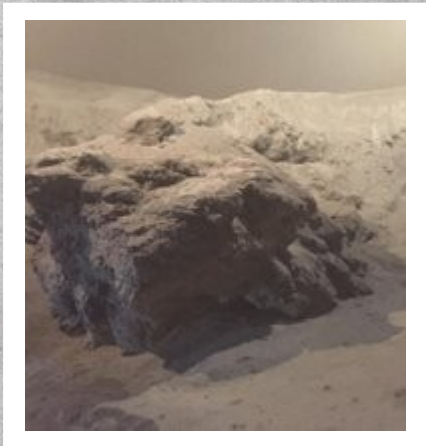
SILO CLEANING 101

- Silo material needs to be kept flowing through the silo
- Build up of material can have catastrophic effects on the structure
- Non Flowing material can render your silo useless for flow and reduce storage



HOW TO KEEP YOUR SILO CLEAN

- Empty your silo often to avoid material compaction and or expansion/hydration of material
- Keep material dry in silo by repairing all roof and silos wall water leaks
- Observe material as it moves through the silo and inspect for flow issues periodically when you empty a silo
- Such as; rat holes, asymmetric flow, clumps
- Have silo cleaned to remove build up or clumps of material as soon as identified



CEMENT SILO CLEANING ISSUES

- Don't let the silo roof and walls leak water into the silos
- Don't over aerate your stored material
- Ensure that your aerating system has air dryers installed and operating
- Frequently empty the silo completely to avoid compaction of stored cement
- Keep your air pads in good operating condition with good fabric to avoid blockages



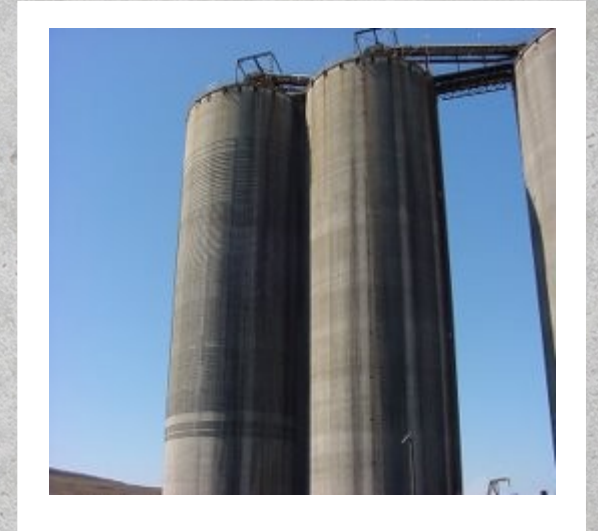
GRAIN/CORN SILO CLEANING ISSUES

- Grain hulls tend to separate and compact against the sidewalls and the bottom of the silo
- This leads to contamination from moldy material
- This can also lead to the release of dangerous gases
- Silos should be completely emptied on a routine basis
- These silos should be professionally cleaned when it is determined that there is residual material remaining in the silo



COAL SILO CLEANING ISSUES

- Wet, moist, or stagnant coal if left in a silo will spontaneously combust
- Coal silos should be cleaned regularly to avoid compaction and spontaneous combustion
- Care should be taken to minimize clay and dirt in raw coal silos
- Keep feeders operating as not to cause asymmetric flow issues.

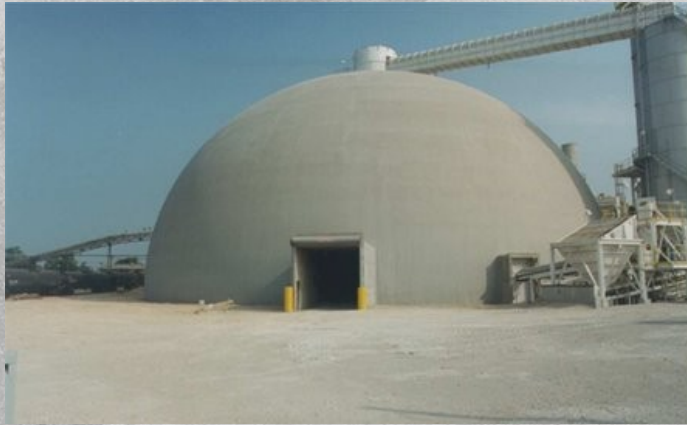


FLY ASH SILO CLEANING ISSUES

- Chemicals for pollution controls can make ash cementitious
- Powder River Basin coal ash is cementitious
- Keep ash cool as it is loaded into the silo
- Keep ash free of unburnt carbon materials
- Hot ash with unburnt carbon can be like molten lava and cools to a hard concrete mass much like coral



KEEP YOUR CONCRETE DOME CLEAN AND AIR PADS IN GOOD WORKING ORDER



3 WAYS TO CLEAN

SILOS IN THE USA

THE BOSS

Get in! Get clean! Get out!



\$

COST PER TON CLEANED
(Least Expensive)

THE BOSS

The Boss Machine
by USA SILOS



\$\$

COST PER TON CLEANED
(Inefficient, Expensive)

CONVENTIONAL

Pneumatic
Cleaning Machine



\$\$\$

COST PER TON CLEANED
(Most Expensive)

SILO CLEANING WHIP



www.usasilos.com
(740) 749-3329



MARIETTA SILOS

www.mariettasilos.com
(740) 373-2822

- “The Boss”
- The nation’s most powerful cleaning machine
- 55% more powerful than anything available
- Runs off compressed air
- Moves more material per hour than the others
- Cleans silos much quicker saving customers substantial cleaning cost and down time

KNOW WHAT IS INCLUDED IN THE PRICE!

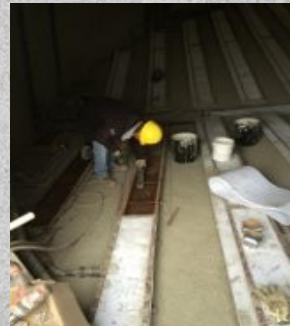
- USA Silos Includes All Coast In The Price And Strives To Estimate Time Honestly
- Our Two Main Competitors Do Not Include Hotels and Consumables
- They Use This To Raise The Price After The Fact
- Also Many Times They Estimate Less Days Then Needed To Falsely Show A lower Budget Price, Leaving The Customer Frustrated When The Bill Arrives

VACUUM TRUCK AND AIR PAD SERVICE

USA Silo Service offer nationwide vacuum truck service to thoroughly clean silos



USA Silo Service also offers air pad repair and maintenance service



STOP WATER FROM LEAKING INTO YOUR SILO.

- USA Silos proprietary rubber roof coating bonds directly to the silo roof top
- Can't peel up
- Can't tear
- Can't blow off
- Easily repairable
- 500% Elasticity
- Offers the most durable silo roof in the industry



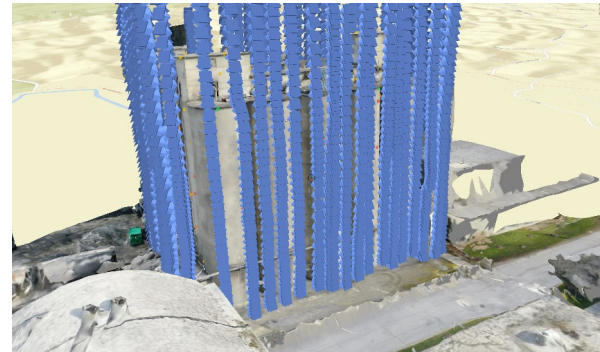
STOP STEEL BOLTED SILO WALLS FROM LEAKING

- USA Silos proprietary rubber wall coating bonds directly to the steel surface
- All bolted joints and gaskets are covered with:
- Two (2) coats of bonded rubber base coating over joints
- One (1) top coat of bonded rubber coating over base coat and entire silo wall



TOGETHER WITH, MARIETTA SILOS SILO CONSTRUCTION, INSPECTION, AND REPAIR

- Nation's only full line silo construction company that can perform Jumpform, Slipform, and Steel Silo construction
- Largest concrete silo repair company in the U.S.
- Existing silos should be inspected every 2-5 years
- We look at interior, exterior, foundation, roof, walls and discharges
- Our engineering staff can provide detailed report of findings and recommendations for repairs



GO TO:

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