RECONNECT

SYMPOSIUM 2022

KNOWLEDGE • OPTIMIZATION • INNOVATION

Stamicarbon 75 YEARS

Workshop operations 2

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Stamicarbon 75 YEARS

Agenda

- Dry recycle. Crusher setting and efficiency of main screen.
- Washing of the granulator. How to make more efficient.
- Advance Coat. Implementation and test results.

Workshop goals

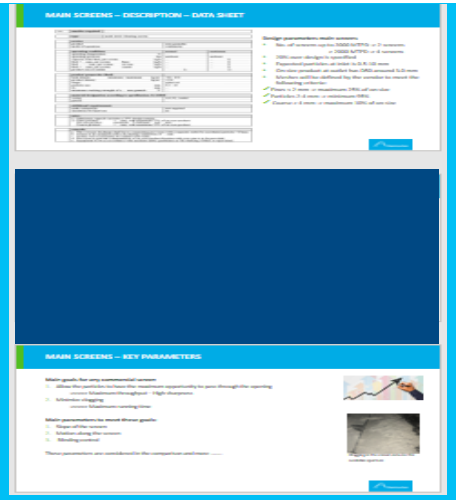
- Dry recycle. Crusher setting and efficiency of main screen.
- Washing of the granulator. How to make more efficient.
- Advance Coat. Implementation and test results.

“Everyone you will ever meet knows something you don't ”
-Bill Nye-

“If you have knowledge, let others light their candles in it ”
-Margaret Fuller-

Workshop format

1



Brief introduction about the topics

2

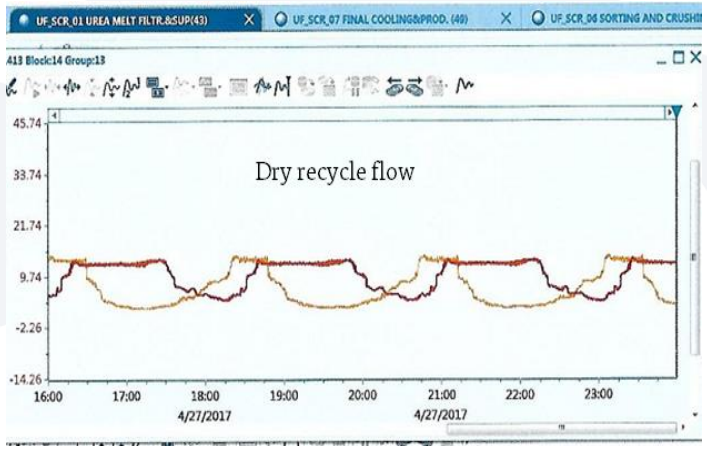
Discussions, reflections and feedback

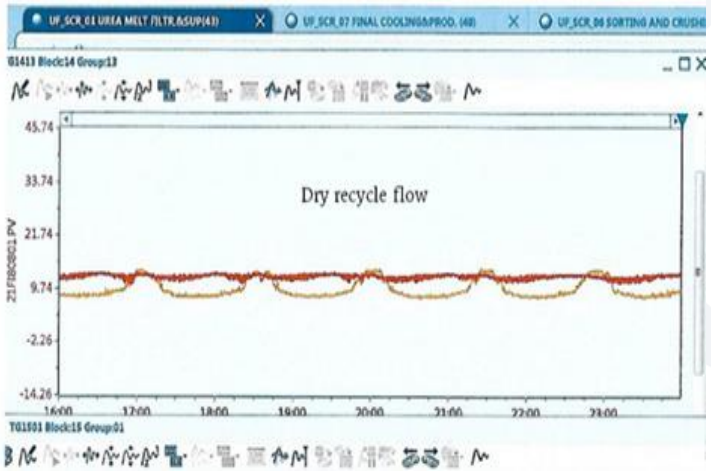
- Interactive session.
- Some questions are given to answer.
- Share your story!

Topic (1): Crushers and screens (1)

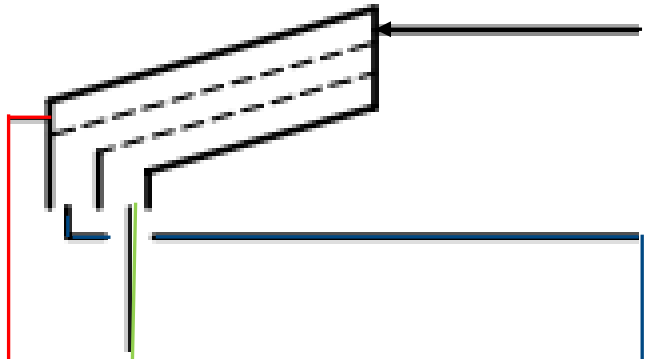
Why are crushers and main screens are linked together?

- Crusher and main screens are both connected to the dry recycle.
- Dry recycle rate can vary between 30% up to 60%.
- Granulation process is a self regulatory process.





Topic (1): Crushers and screens (2)



Under size (Fines):
D_{50} around 1.6 mm
Fines is about 22.5-45 % of on-size
< 2mm -> max. 25% lost in on-size
(Sharpness)

Product (On-Size):
D_{50} around 3.0 mm
2-4 mm Min. 95 % (Sharpness)

Coarse (over Size):
D_{50} around 4.5 mm
Coarse is about 7.5-15 % of on-size
>4 mm -> max. 10% of on size (Sharpness)

Sharpness of the screen

The ability of the screen to separate a specific cut.

	Case 1			Case 2		
Cut	<2	2-4	>4	<2	2-4	>4
Fines	46.24	53.69	0.07	42.18	57.82	0
on-Size	1.05	94.27	4.68	2.6	96	1.4
Coarse	0.04	15.16	84.8	0	47	53

Proper adjustment of the mesh size during the plant commissioning is of utmost importance.

Topic (1): Crushers and screens (3)

Main goals for any commercial screen

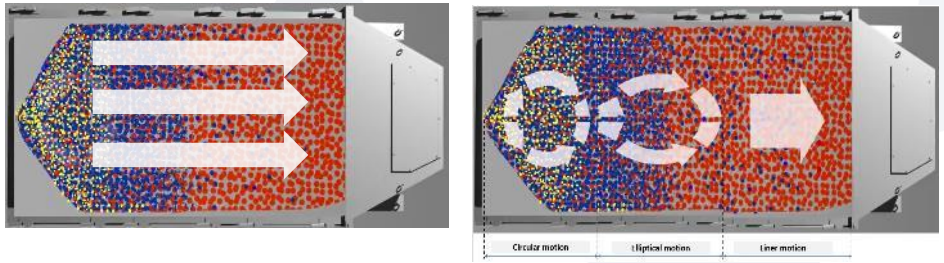
- Allow the targeted particles to have the maximum opportunity to pass through the aperture

  ->>>>> Sharpness

- Minimize clogging

  ->>>>> Maximum running time

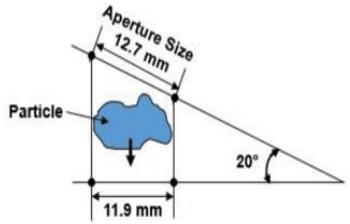
Clogging in the screen reduces the available aperture



On left picture liner motion VS combination of circular, elliptical and liner motions on the right picture

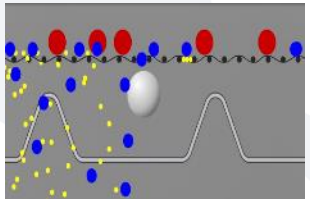
Main parameters to meet these goals:

- Slope of the screen
- Motion along the screen
- Blinding control



High inclination needs higher the aperture for separation

Impulse forces by motor for cleaning



Bounce balls as a cleaning mechanism in screens

Topic (1): Crushers and screens (4)

Coarse material
Inlet to the crusher
D_{50} ≈4.3 mm

Crushed product
Outlet of the 1st stage (upper roller)
D_{50} ≈2.3 mm

Crushed product
Outlet of the 2nd stage (Lower roller)
D_{50} ≈1.65 mm

High performance of the crusher, to achieve the required crushed size with minimum downtime, needs preventive measures.

Efficient dedusting lines, frequent flushing and cleaning of the crusher will avoid dust accumulation and smearing on the rollers. Most of the mechanical failure of the motor belts and the crusher stoppage during normal operation is due to dust accumulations.

Questions - Topic (1)

Topic (1): Crushers and screens

In your Plant:

1) Do you have a pervious experience with deficiency of the crushers and screens that affect the quality of the final product or any other parameter in your plant?
2) How often screens and crushers get fouled?
3) What are the common issues from process and mechanical perspective?
4) What are the regular procedures for cleaning and maintenance.
5) What are the main key performance factors of operation?

Share your story

Crusher at Stamicarbon plant

Main screen at Stamicarbon plant

Topic (2): Granulation washing (1)

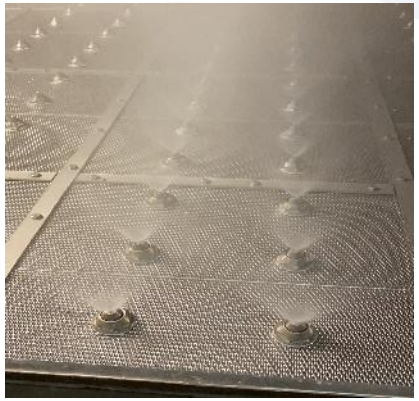
- Washing interval differ from one plant to another depending on many factors such as: preventive maintenance requirements, operating conditions of the granulation, experience of the operators, etc.
- Proper cleaning of the granulation equipment will significantly contribute to long running time.
- The main trigger of the washing is normally observing lumps in the lump screen.
- The key factor of saving time during the washing is the proper planning of the activities.
- Stamicarbon gives some instructions in the OM, during the clients training and during the start-ups to guide the operation team during the washing activities.
- Once operation team gains more experience with the granulation unit, washing time can be significantly reduced.

Fouling in the baffles of the granulator

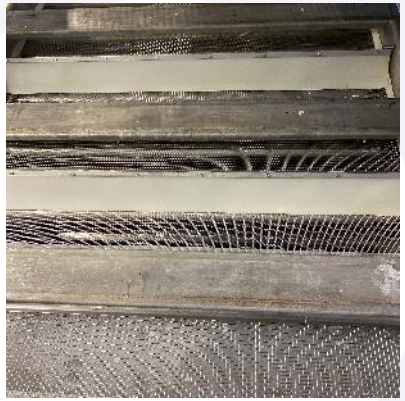
Fouling in the plates and around the nozzles

Topic (2): Granulation washing (2)

- Inspection and cleaning all the equipment.
- Spray check for the nozzles.
- Leak test of the sprayer gaskets.
- Clean the granulator walls from dust.
- Clean the rollers of the crusher.
- Check the status of the meshes of the screens.
- Check the tracking of the belts.
- Check and clean of the product cooler if needed.



Spray check prior granulator start



Checking the meshes of the main screens

Inspection of the plates of the product cooler

Inspection of the rollers of the crusher

Questions - Topic (2)

Topic (2): Granulation washing

In your plant:

1) What are normally the reasons of stopping the granulation unit?
2) What are the common observations during the inspection?
3) What is the average washing and cleaning time of the granulation section?
4) What are the common practice/procedures followed for washing (Stac. OM, own procedures, etc.)
5) What are the limitations during washing the plant (i.e. high level in urea solution tank, small capacity of dissolving vessel, etc.)

Share your story

Dust accumulation on the walls and roof

Lump snow-man (man-made by the operators)

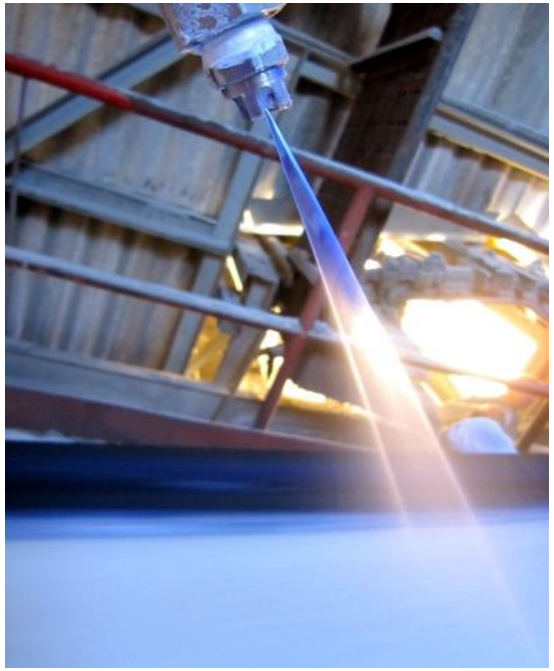
Topic (3): Advance Coat™ (1)

Methods of applying anti-caking agents

- Internal conditioners (e.g. urea formaldehyde)
  - Outlet of first evaporation.
  - Outlet of second evaporation (before the melt pump).
- External conditioners (i.e. coatings)
  - Spraying in a coating drum.
  - Spraying on the final product belt.

Topic (3): Advance Coat™ (2)

- Advance Coat™ is Stamicarbon's safe and easy to implement solution for caking issues.
- "End of the production line" add-on.



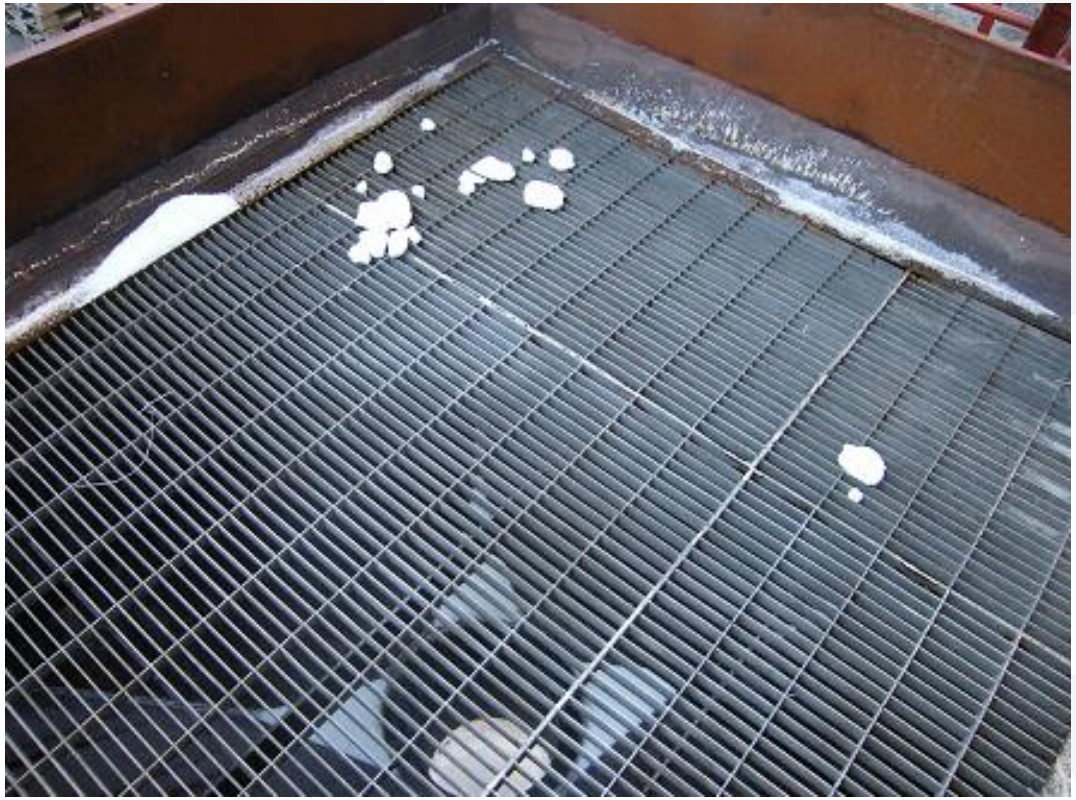
Topic (3): Advance Coat™ (3)

		Urea Formaldehyde	ADVANCE COAT™
• Odour		Pungent, irritating	Odourless
• pH	at 20°C	8.0	7.0
• Density	at 20°C	1.08 g/cm^3	1.04 g/cm^3
• Viscosity	at 20°C	300–500 cP	< 50 cP
• Storage temperature		21-40°C	5-50°C
• Potential health effects		Toxic	Not toxic
• Combustible liquid		Yes	No
• Flashpoint		80°C	n.a.

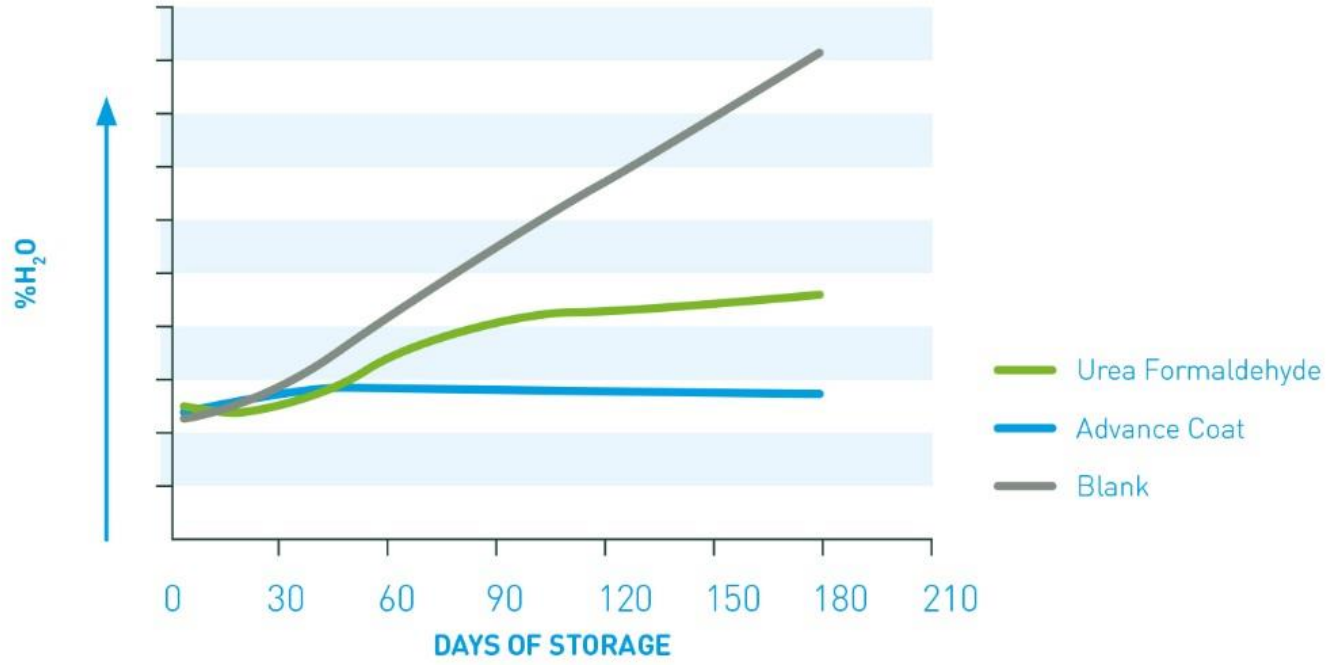
Topic (3): Advance Coat™ (4)

Prills treated with UF85
after 6 months of storage

Prills treated with Advance Coat™
after 6 months of storage

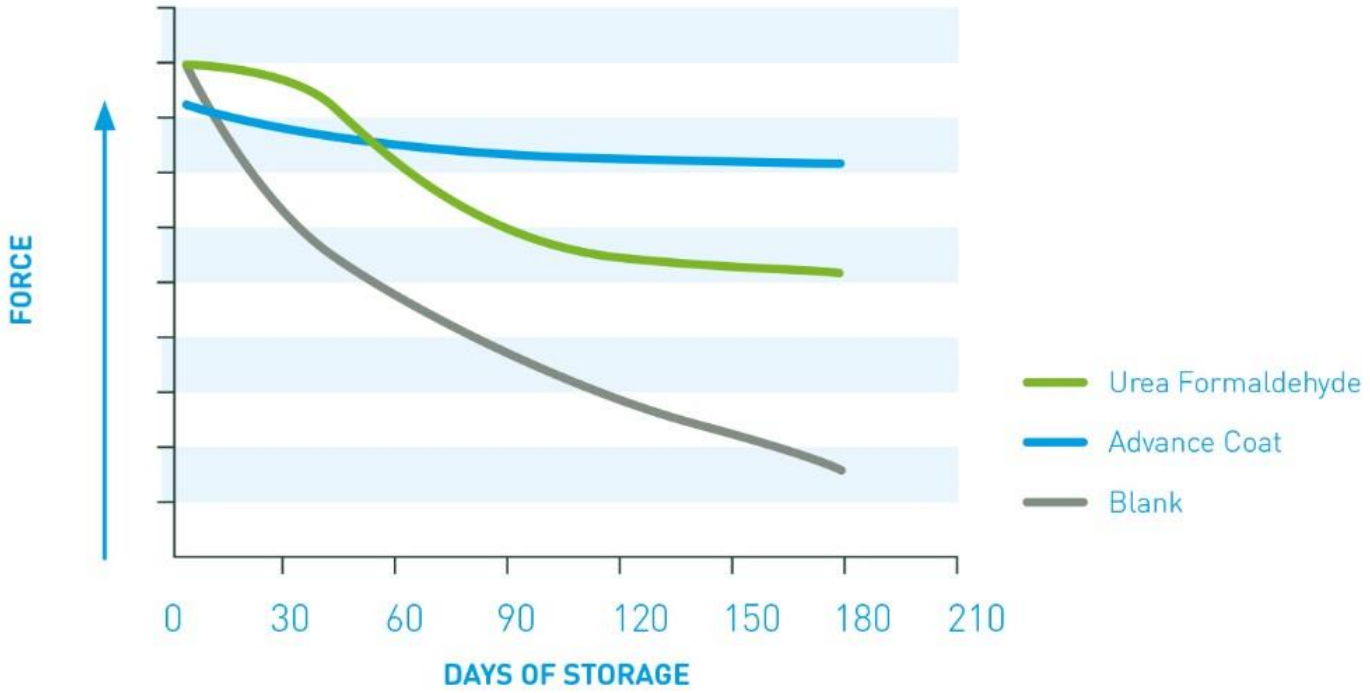


Topic (3): Advance Coat™ (5)



Prills treated with ADVANCE COAT™ absorb less water than both those untreated and those treated with urea formaldehyde.

Topic (3): Advance Coat™ (6)



The dynamic strength of urea prills treated with ADVANCE COAT™ are not hardly decline in comparison with the untreated prills and urea formaldehyde treated prills which has lost more than half of its dynamic strength after 6 months of storage.

Questions - Topic (3)

Topic (3): Advance Coat™

In your plant:

1) Do you encounter caking issues? How do you tackle them?
2) What is the maximum period you can store your prills/granules without facing caking issues?
3) Any experiences with other types of anti-caking agents and coatings?
4) Do you hear any complaints from your clients about caking issues on their premises?

Thank you!

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