Blast Cleaning Fundamentals

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THE 3 FUNDAMENTALS FOR EFFİCİENT FOUNDRY BLAST CLEANİNG

Using the
Correct Abrasive
Size for the job!

Correct
Abrasive Aim

Maximizing Blast Machine
Abrasive throwing potential

FACİNG THE TRUTH

FACT:

Most companies blast cleaning, experience poor cleaning results, or longer than necessary cycle times due to either using the wrong sized abrasive or having an abrasive work mix that is out of balance!

SAND REMOVAL

CHOOSİNG THE RİGHT ABRASİVE FOR FOUNDRİES

- Type of blast equipment is available (Air blast / Wheel Blast)
- How large the castings are
- Amount of sand remaining on the castings before cleaning
- Desired casting surface result
- Coating process required after de-sanding
- Distance from the blast wheels to the parts

THE RİGHT ABRASİVE FOR THE JOB

Aluminum Castings –
Most blast machine manufacturers would recommend a small sized stainless steel shot. Aluminum castings may also be cleaned using low carbon steel shot which is much lower cost than stainless steel and typically does not leave any ferrous residue on the surface of the parts

Steel/Iron Castings –
Depends on the size of the castings and the machine type but typical shot sizes in use would be S390,S460, S550 in Europe and S280, S330. and S390 in the USA. Blast wheels run at 3600rpm in the USA due to the 60Hz power rating compared to 3000rpm in Europe due to 50Hz power rating. The greater the wheel speed the faster the shot flies to the parts. The faster the shot the greater the transmitted energy.

The rule of thumb is always use the smallest size shot that will remove the heaviest contaminant. The smaller the shot the greater the number of impacts per minute, the shorter the cycle time.

HİGH CARBON STEEL SHOT

Pros:

Used a lot in foundries for removing sand.

Removes sand very efficiently from castings

Increased blast machine wear parts erosion due to the amount of scale on the surface of the new shot particles

Higher amount of dust generated during blasting over low carbon alternative

Cons:

Breaks down quicker than low carbon due to the amount of stress cracks evident from the atomizing process.

Increased maintenance cost due to scale and dust

Cannot be used to clean aluminum castings due to ferrous contamination that causes corrosion

LOW CARBON STEEL SHOT

Pros:

Used a lot in foundries for removing sand.

Can be used to clean aluminum castings effectively due to lack of scale on the particle surface and low carbon content

Removes sand very efficiently

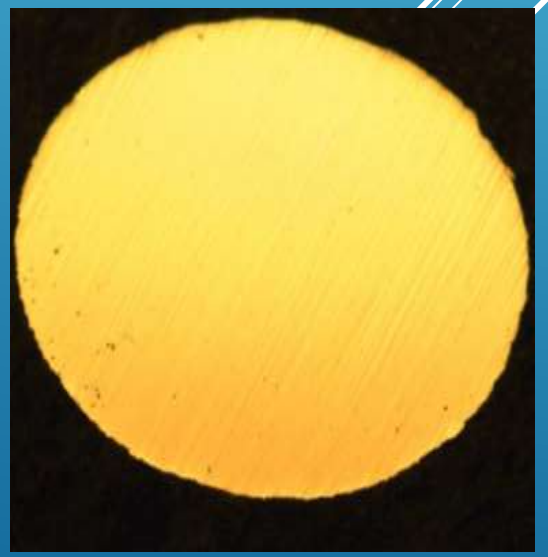
Greater durability compared to high carbon steel products due to virtually no stress cracks being generated during atomizing.

Reduced blast machine wear due to less dust in work mix

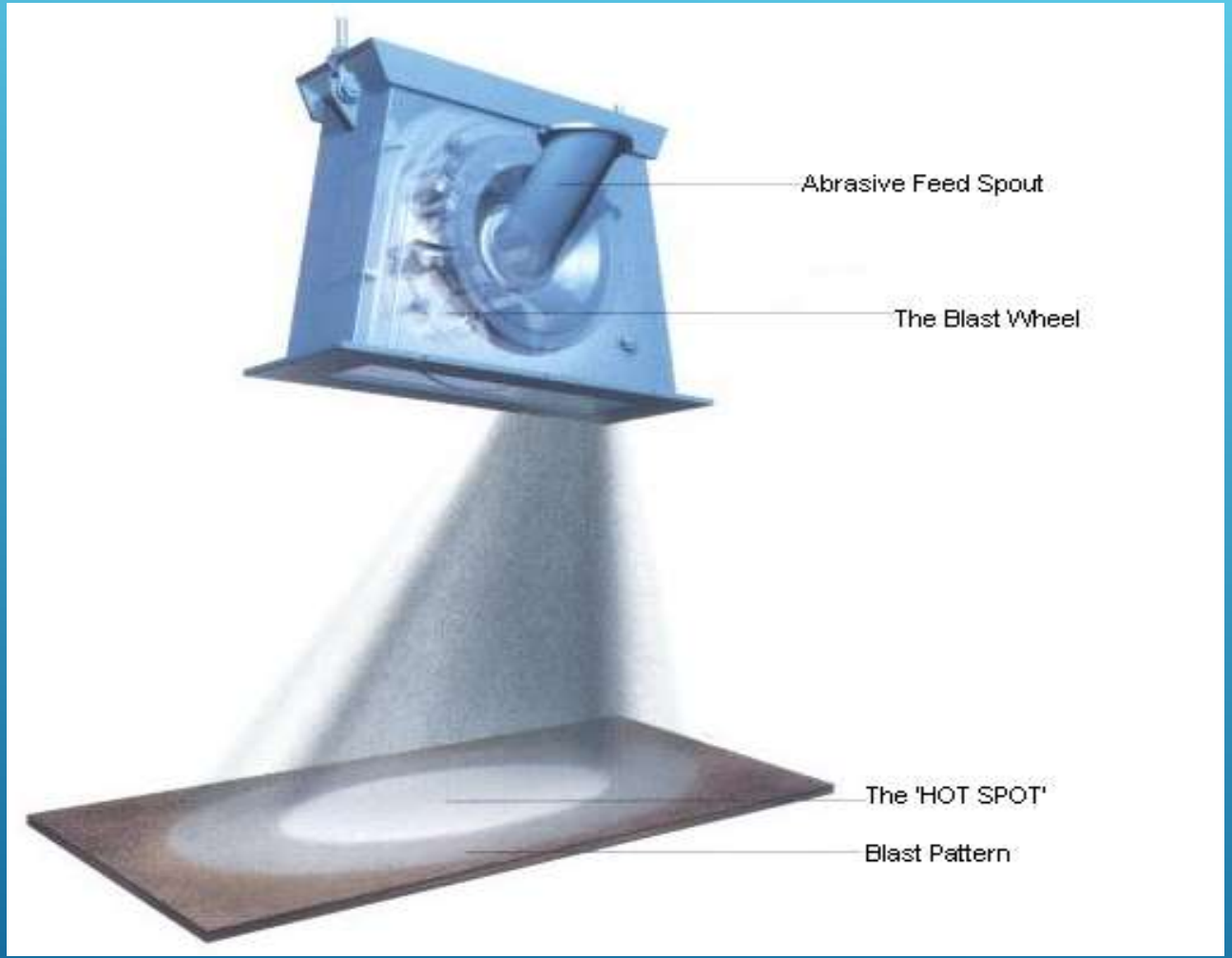
Work hardens in use (typically from 40 HR C to 45-46 HR C)

Cons:

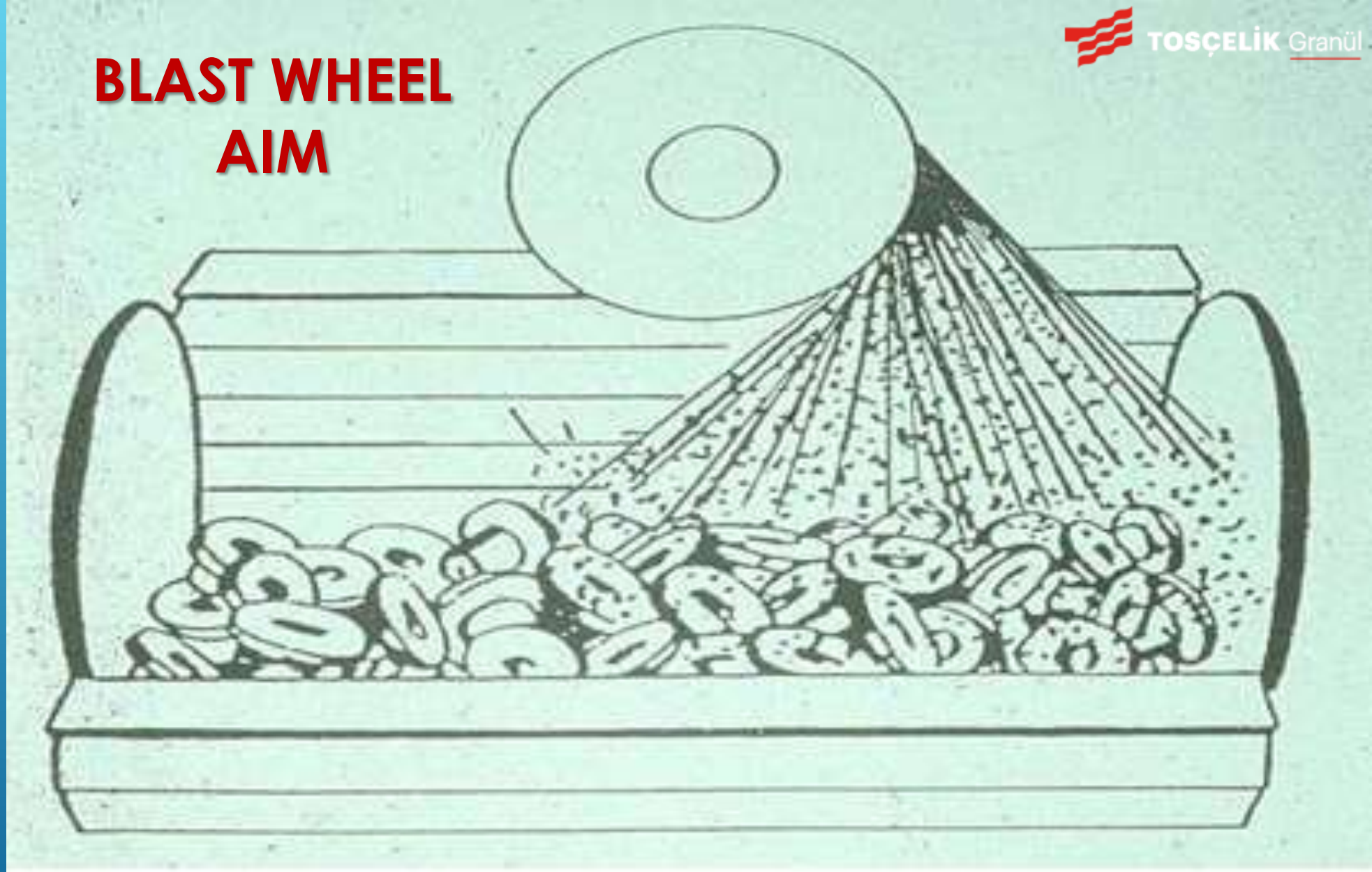
Grit is not possible to manufacture from low carbon shot
Cannot be used in most peening applications



BLAST WHEEL AİM



BLAST WHEEL AIM



Throwing abrasive in the wrong direction increases cycle times and COST!

Abrasive Consumption is increased

Wear parts are worn out prematurely

Down time is increased

10% Movement out of alignment can reduce efficiency by up to 35%

BLAST WHEEL BLADES – READİNG THE SİGNS

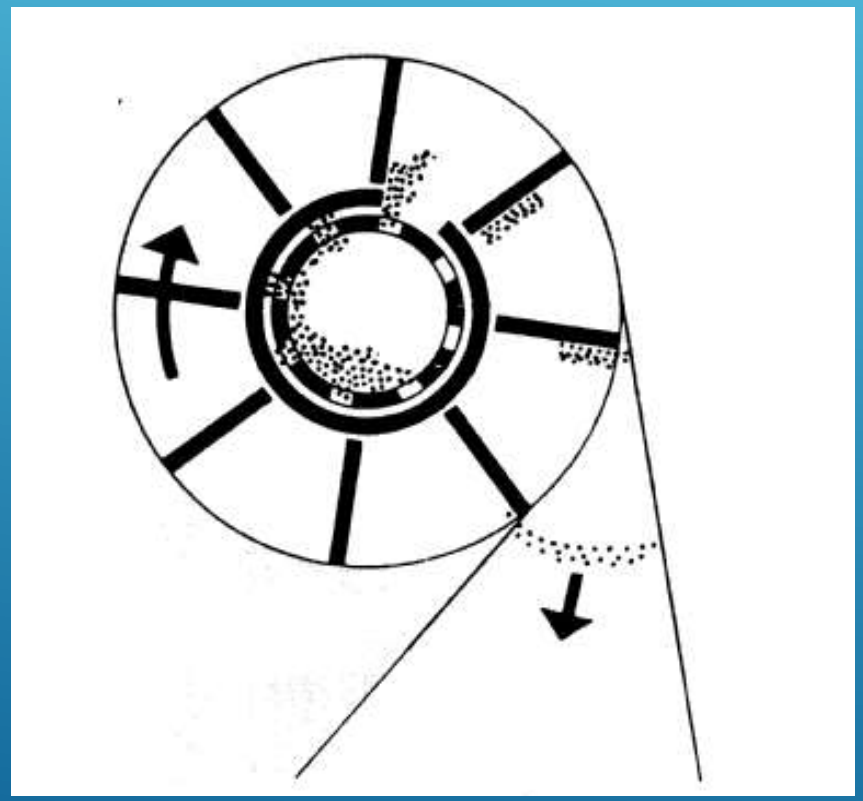
Q: What's causes this type of blade wear pattern?

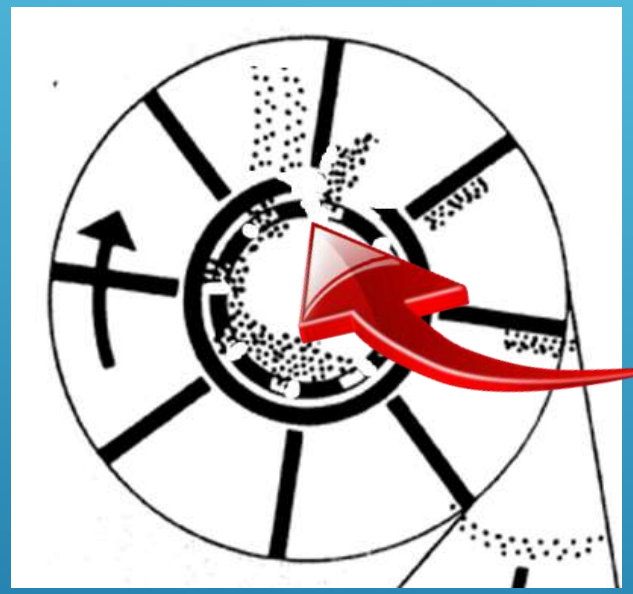
A: Sand

Q: What is wrong with the other wheel components when you see this wear pattern?

A: Impeller and control cage worn out

WORN IMPELLER





Shot and dust wear away the impeller fingers until it starts to wear away the base of the blades.

Shot then travels up the back and front of the blades which seriously affects the blast pattern.

CENTRE IMPELLER WEAR

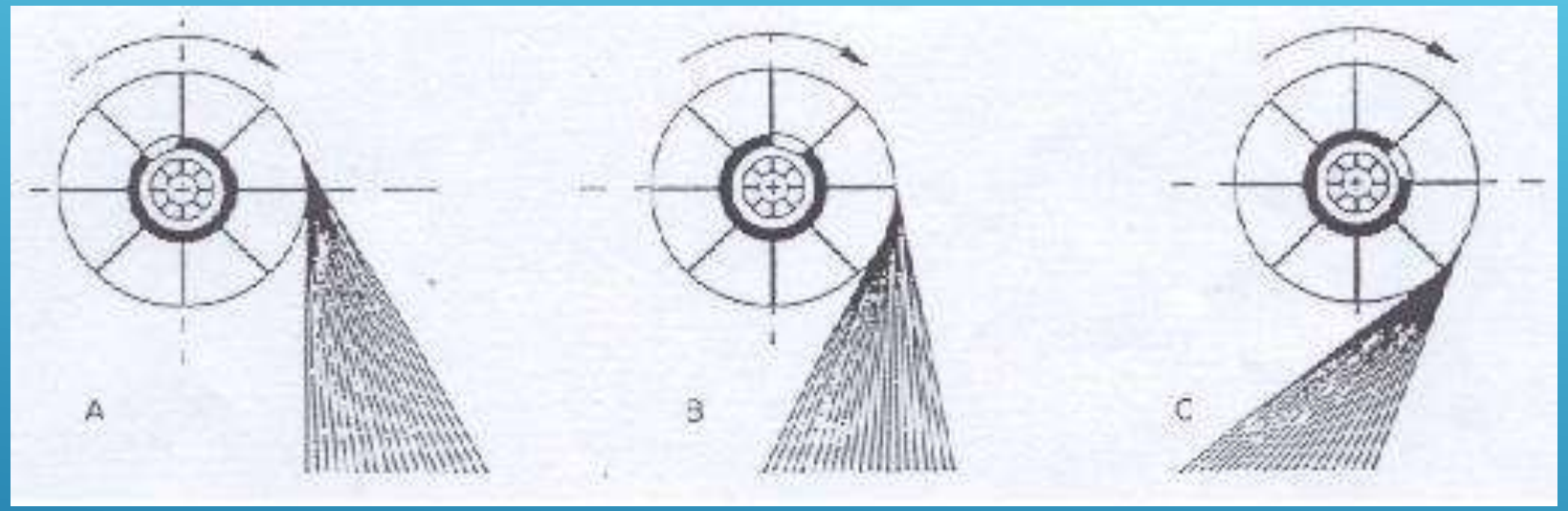
Worn impellers cause the base of the blades to wear and affect the blast pattern!!

WHEN TO CHANGE BLAST WHEEL CONTROL CAGES?

Control cages should be changed when the chamfer is worn away.

Keep in mind the ratio of movement of the control cage to the hot spot is 1:12. The chamfer is ½” wide. When the chamfer has gone the hot spot has moved how far?

SETTİNG THE BLAST PATTERN ‘AİM’



- The blast pattern can be adjusted by rotating the control cage left or right
- Ratio of movement is 1:12

MAXİMİZİNG SHOT VOLUME

Means hitting the parts with the maximum number of impacts per minute to keep cycle times to a minimum.

Keeping Ammeters in good working order and calibrating them regularly is essential for efficient blast cleaning.

OPERATE AT MAXİMUM SHOT LOAD!

Each Amp between the No Load for the blast wheel motor, and rated Full Load is equivalent to 13kg of media per minute

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BLAST WHEEL MOTOR AMPERAGE CHART

ELECTRIC MOTOR Power Rating		460 Volts (3 phase - 60Hz)		
		No Load Amps	Full Load Amps	Utilized Amps
7.4kW	10hp	4	13	9
11kW	15hp	6	18	12
15kW	20hp	8	24	16
18kW	25hp	10	29	19
22kW	30hp	11	34	23
30kW	40hp	15	45	30
37kW	50hp	18	56	38
44kW	60hp	20	65	45
55kW	75hp	27	80	53

Note: Each Utilized Amp is equal to 14Kg of abrasive per minute!

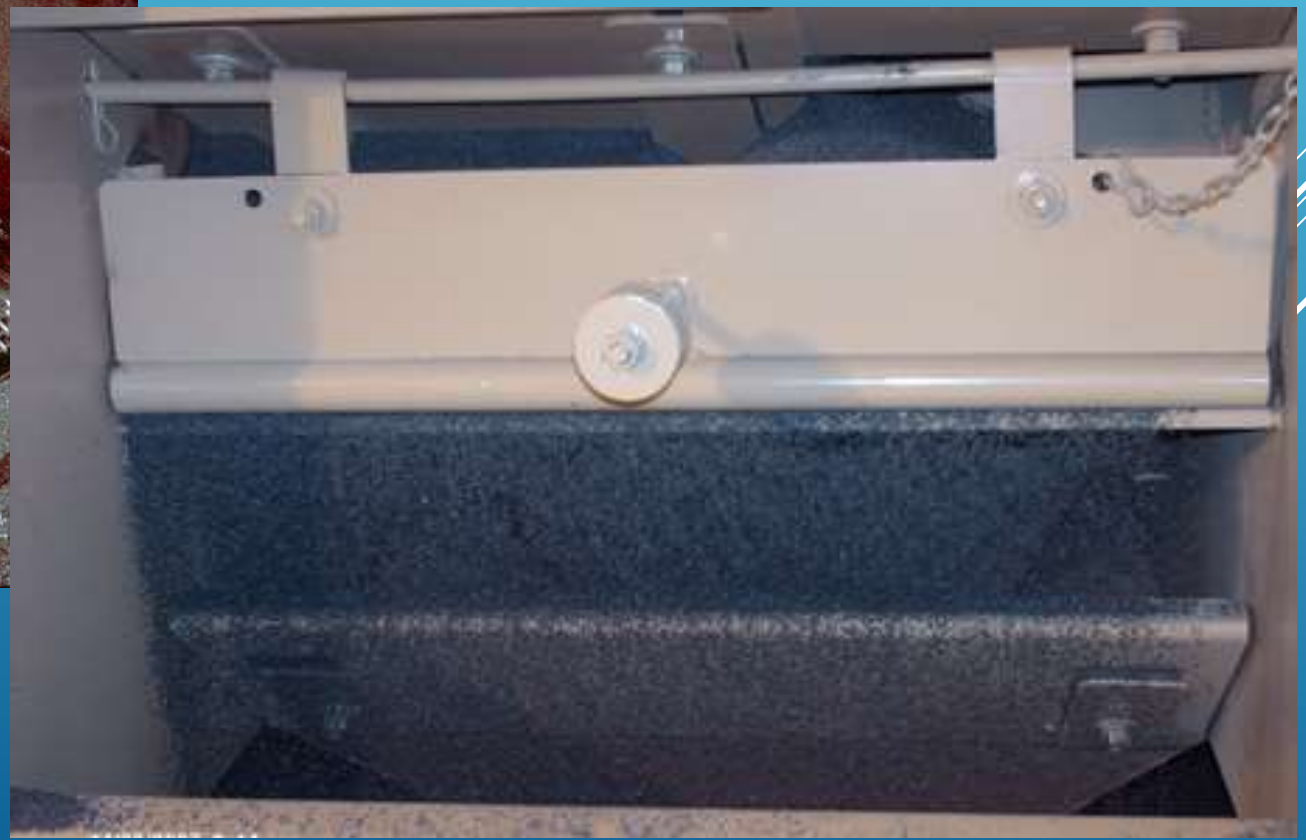
TROUBLE SHOOTİNG

- Blast wheel does not reach maximum amperage?

- Insufficient media in the hopper
- Blocked feed pipe
- Shot valve open too much (system “chokes”)
- Worn center impeller, control cage, or blades.

A MAJOR EFFECT ON BLAST MACHİNE EFFİCİENCY İS LACK OF ABRASİVE VOLUME

What is Wrong with these two separator's settings?

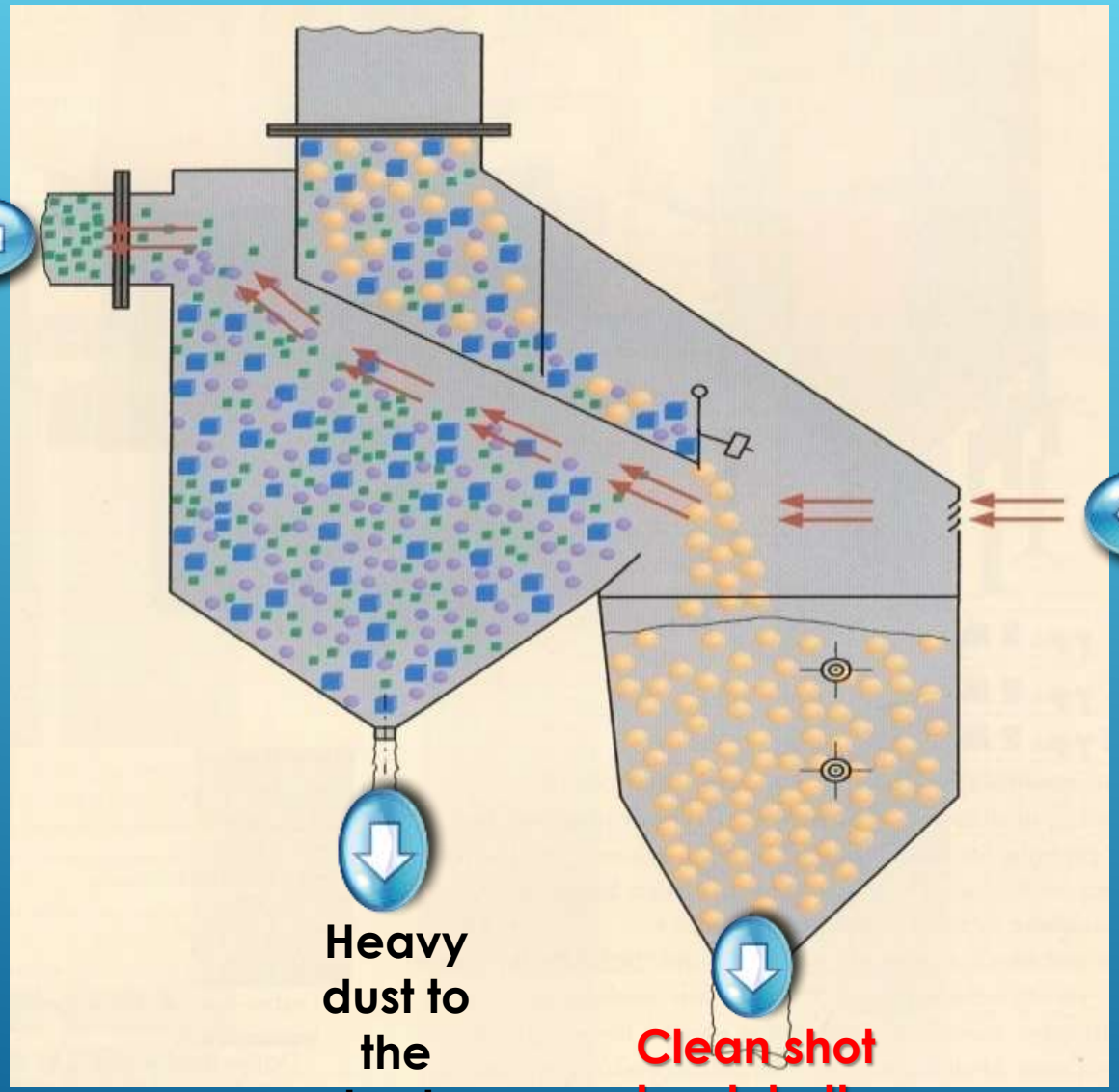


AİR WASH SEPARATOR
THE BLAST MACHİNE COST CENTRE!

Extraction air will take the easiest path through the gaps in the media ‘curtain’ leaving dust or sand to fall into the work mix hopper. ½% of sand by volume in the work mix reduces the life of blast wheel components by as much as 50%!

Air velocity increases through the gaps also, pulling useful shot into the waste bucket below.

AİRWASH SEPARATOR OPERATİON



Light dust to the Dust Collector

Air Flow through the shot curtain

Heavy dust to the trash can

Clean shot back to the blast wheels

FACING THE TRUTH

9 out of 10

Companies blast cleaning waste between 20% and 40% of usable abrasive due to incorrectly set air wash separators.

It is essential to check that there is a full abrasive curtain in the separator and usable abrasive is NOT being lost into the waste.

AİR WASH SEPARATOR WİTH ENOUGH ABRASİVE FLOWİNG

Once the problems with the blast wheel wear parts and settings has been resolved and the blast wheels are throwing the correct amount of abrasive the Airwash separator controls can be set like the picture above. Dust collector extraction air travels through the abrasive pulling fines and sand from the abrasive operating mix

DUST COLLECTOR
THE BLAST MACHİNE'S VACUUM CLEANER

The most overlooked part of any blast machine.

Insufficient airflow through the Separator causes sand in the abrasive Operating Mix.

½ % by volume of sand in the shot operating mix can reduce the life of wheel assembly wear components by as much as **50%**

Insufficient extraction from the blast cabinet causes dusty unacceptable parts

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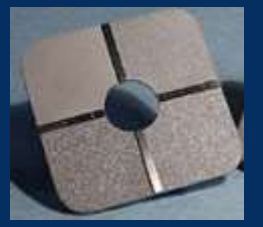
THE RESULTS OF POOR ABRASİVE CONTROL

Work Mix Too Coarse	Increased Cycle Time
Work Mix Too Fine	Increased Cycle Time
Sand/fines Contamination	Fast Wear Plate Erosion
Increased Separator Particle Size Removal	Increased Media Consumption
Unbalanced Abrasive Working Mix	Unacceptable Cycle Times Unacceptable Surface Roughness



LOONEY TUNES

REG. U.S. PAT. OFF.

Produced by

LEON SCHLESINGER

IN TECHNICOLOR