FINTEC
METAL FINISHING TECHNOLOGY

Blast Wheel Technical Bulletin

THE ERVIN POSTER
TROUBLESHOOTING THE BLASTCLEANING PROCESS

CHALLENGE NO. 3: Don't Short-Change Your Blast-Wheel!

Be Sure to Use 100% of the Wheel's Abrasive Throwing Capacity

Ervin's Trouble-shooting POSTER deals with the ***three*** key challenges in airless blastcleaning that can account for as much as 90% of all problems adversely affecting *quality of finish, cleaning productivity,* and *operating costs:*

Challenge No. 1: **Aim of the abrasive blast-stream —** If you don't hit the work, you can't clean it. (See Technical Bulletin, Vol. VIII, No. 5)

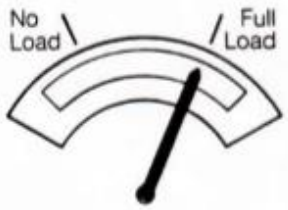
Challenge No. 2: **Controlling abrasive work-mix size balance.** Bird-hunters load their gun with bird-shot, *not* with deer-slugs. Likewise, in blast-cleaning you must be sure that the blast-wheel is throwing the right size mix. (See Technical Bulletin, Vol. VIII, No. 7).

Challenge No. 3: **Don't short-change your blast-wheel** by throwing *25%, 33%, or 50% less* abrasive than the wheel's capacity. Either of two things result — both *bad*: (1) Poor cleaning, incomplete contaminant removal; (2) Extended blast-cycle times, decimated productivity, out-of-sight costs.

THE ANSWER TO CHALLENGE NO. 3

ALWAYS

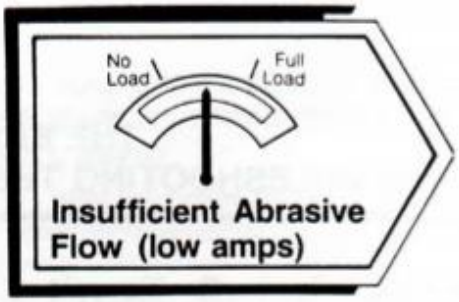
Keep the ammeter readings *at full load*



FULL ABRASIVE FLOW

NEVER

Let the ammeter readings stay below full load



THE AMMETER

This *sensitive* device registers the amperage load on the motor that drives the blast-wheel. It's the only practical way of determining how much shot or grit is being thrown by the wheel during the blast-cycle. *Peak efficiency from your blast equipment is attained only when the wheel throws the rated maximum quantity of abrasive.* Proper adjustment of the abrasive control valve is necessary to insure that sufficient abrasive goes to the wheel to bring the ammeter up to the full-load reading.

UNBELIEVABLE!

A two-year-long Ervin Blastcleaning Task Force Study developed the incredible fact that more than *seven out of 10* blast machines inspected were, *intentionally*, running substantially *below* full-rated abrasive flow capacity! Slow and spotty contaminant removal resulted, because of fewer strikes per minute. To offset the poor cleaning, blast-cycle time, in many instances, had been *increased by 25% to 50%* (or line speed reduced accordingly). Consequently, productivity was slashed and operating costs soared, as more machine time and labor were required to clean a given unit of work.

Slower cleaning rates often required almost constant machine operation, cutting down time available for normal and/or preventive maintenance, causing them to run with worn-out wheels or plugged, malfunctioning air-wash separators, etc. In turn, this invariably led to major breakdown and extended shut-down of the blast equipment. A disaster scenario! AND, ALL BECAUSE OF SHORT-CHANGING THE BLAST-WHEEL!

THE ERVIN POSTER

They are available at no charge. Post one in the cleaning room office — post one at or near each blast unit. The POSTER not only tells you what troubles to look for — it has Guidelines for helping you control those three critical variables that can cause 90% of your blastcleaning problems.

Don't hesitate to call on your Ervin sales representative for help. He stands ready and willing to help you get started on your do-it-yourself trouble-shooting program. He can provide you, at no cost, forms needed for a thorough blastcleaning operations analysis, and forms for initiating a simple cost-control program (Abrasive Addition Records), and can also provide Ervin Technical Bulletins dealing with specific questions or problems you may have.

Anyone who knows the blastcleaning process knows that the problems described in the Ervin POSTER almost certainly *will happen,* sooner or later, if they aren't already there.

OUR MESSAGE:

EXPECT THE PROBLEMS, YES —
BUT DON'T TOLERATE THEM.

Ervin Industries can help you cope with these problems.
Let us help you — COPE — SOLVE — AND
NEVER AGAIN TOLERATE THEM.

WHAT IS FULL ABRASIVE FLOW FOR YOUR BLAST-WHEELS?

Obviously, this will vary to some extent depending on the make of your blast equipment, wheel-motor horsepower, wheel size, wheel RPM, etc. However, as a rough rule-of-thumb guide, approximately 25 pounds of steel shot or grit (give or take two or three pounds) will be thrown for each unit of horsepower. Using the 25-pound number, data showing the amount of abrasive flow, *at full load,* for various horsepower wheel motors has been developed for standard 19½" diameter wheels:

Wheel Motor HP	Abrasive Flow Rate* Lbs./Min.	Ammeter Readings – 440V** (220-V = Double all numbers)			TROUBLE GUIDE Ammeter Reading That Represents X% less Abrasive Flow		
		No Load	Full Load***	Work Amps	-25%	-33%	-50%
15	375	7	19	(12)	16	15	13
20	500	9	27	(18)	23	21	18
30	750	12	36	(24)	30	28	24
40	1000	17	49	(32)	41	38	33
50	1250	20	61	(41)	51	47	41
60	1500	25	73	(48)	61	57	49
75	1875	33	94	(61)	79	74	64
100	2500	41	116	(75)	97	91	78

Trouble-Guide Example: 30 HP motor, amps @ 28 instead of 36 full load means 33% less abrasive flow vs. full load.

*(Approximate! For actual data, check your equipment manual.)

**(Make sure ammeter is properly calibrated.)

***(Approximate! For actual full-load amps, check motor name plate.)

THE KEY: THE *WORKING AMPS*

To calculate the number of working amps, the no-load (no abrasive flow) amp reading must be deducted from the rated full-load amps. To calculate the loss of efficiency (reduced flow), the number of amps less than full-load amps is divided by the working amps. **Example:** If working amps = 12, a reading of "only" 4 amps less than full load on a 15 HP motor, calculates out to *33% loss of abrasive flow* (4 ÷ 12).

Another useful rule- of-thumb number is that a rough average weight of abrasive thrown per *working amp* is about *30 pounds.* Thus, if your ammeter reading is 4 amps below full-load amps, it means your blast-wheel is being short-changed by about *120 pounds* of shot or grit *each minute;* at 10 amps below full-load, the wheel is being short-changed by about *300 pounds per minute.*

WHAT YOU DON'T THROW,
CAN'T CLEAN YOUR WORK!

CAUSES OF INSUFFICIENT ABRASIVE FLOW — AND, WHAT TO DO ABOUT IT

1. Failure to recognize that the ammeter is a sensitive device used in a rough environment, making it subject to failure and inaccuracy, eventually.

   CALIBRATE YOUR AMMETER PERIODICALLY AND KEEP IT IN GOOD WORKING ORDER, ALWAYS!

2. Failure to establish and *post* the full-load amps target right above the ammeter. The target should be full-load amps, *not a "comfort zone"* that can kill you with kindness, as our Task Force found in one instance:

   > Full load was 48 amps, but the posted "comfort zone" was 40 to 30 amps. Disaster! At 40 amps they would run at 25% less than full flow; at 30 amps the abrasive flow was less than half of full-load flow!

   Remember: Every *one amp* below full-load can represent 30 pounds of shot or grit *not thrown, each and every minute!*

   POST THE FULL-LOAD AMPS!

3. Not enough abrasive in the system. This usually occurs when each shift keeps putting off adding

abrasive, hoping the next shift will do it (Murphy's Law at work). Or, even more commonly, wrongly using low ammeter readings as the signal it's time to add abrasive — the problem: how low does the hopper level get before you add? — 25%, 50%, or nearly empty? There is only one safe solution:

ADD ABRASIVE EVERY OPERATING SHIFT — AND MAINTAIN THE HOPPER LEVEL ABOVE ⅔-FULL, ALWAYS!

4. Foreign material located in the system, impeding abrasive flow. This can occur in several critical areas: clogged scalp screens; elevator boots; spouts; or even in the wheel-impeller. Remember: the blast-wheel's abrasive stream is perhaps the world's greatest shredder of paper, cardboard, plastic, wood, etc., and can reduce them quickly into prime rat's-nest material that can and will plug anything. There is only one answer:

KEEP ALL TRASH OUT OF THE BLAST-CLEANING EQUIPMENT — IT IS NOT A TRASH BIN!

5. Excessive wear of the blast-wheel impeller — this will usually lead to flooding the feed spout because the impeller has lost its ability to keep up with the flow of shot or grit, and a low amperage reading will result. To avoid this problem, use the same precaution necessary to prevent a badly worn impeller from distorting the shot-blast stream and shifting its aim:

INSPECT THE IMPELLER WEAR DAILY; CHANGE IMPELLERS WHEN THE LEADING EDGES HAVE WORN MORE THAN ⅛-INCH!

6. Belt-slippage: (a) on the drive from the motor to the wheel-shaft — power transmission will fall below normal; (b) elevator belts — the elevator won't be able to deliver the quantity of abrasive needed. To do:

CHECK THOSE BELTS PERIODICALLY!

USE THE AMMETER TO DIAGNOSE/ IDENTIFY TROUBLES

When the blast unit is operating under no-load conditions, check the ammeter to see if it maintains a constant reading, with no fluctuation. Any significant fluctuation can signal problems such as improper belt tension, bearing problems, or improper adjustments creating drag, etc.

To determine whether low amperage is due to the wheel being starved, block the abrasive flow to the wheel while the equipment is operating. If the amperage reading just falls off, the wheel *is* starved. If it jumps back to a full-load reading before falling back to the no-load reading, it signals a choked or flooded wheel.

If the ammeter starts off at full load at the beginning of the cleaning cycle and then drops off during the cycle, it is an indication that the feed hopper has run empty and the wheel is starving.

IS THERE EVER A REASON FOR DELIBERATELY RUNNING AT LESS THAN FULL AMPS?

Blast equipment manufacturers quite universally recommend operating *only with full abrasive flow* in normal blastcleaning applications. Their claims relative to operating performance on cleaning ability and throughput are based on full abrasive flow. As our Table shows, there is available a wide selection of HP ratings and abrasive flow — the HP choice should have been made to suit the indicated needs.

Yet our Task Force encountered instances (rarely) where the user had backed off from full abrasive flow. One reason was that the nature of their work had changed, and they found that the full load now caused a pile-up of abrasive that tended to cushion or mask certain areas. Relief was found by reducing the flow.

Another reason was held to be that the user had built in an "over-kill" factor in his operation by specifying extra wheels, or higher than needed horsepower wheels — the reasoning: It would let them operate the equipment even when conditions were bad (excessively worn wheel components, improper work-mix sizing, low amps, etc.) — and, when other conditions were OK, they could run on reduced feed. The problem: The other conditions were seldom OK, and, being blissfully unaware of that, by running on low amps, they only compounded their problems. Also, invariably, no matter what reduced amp level they had targeted, because of the problems described earlier, they actually operated at levels even lower than their reduced target.

To do: Whatever the rationale, whatever the amp level selected as target —

POST THE TARGET AMPS,
AND NEVER,
BUT NEVER,
OPERATE BELOW THAT LEVEL!