

# Technical Bulletin

ERVIN INDUSTRIES, INC.

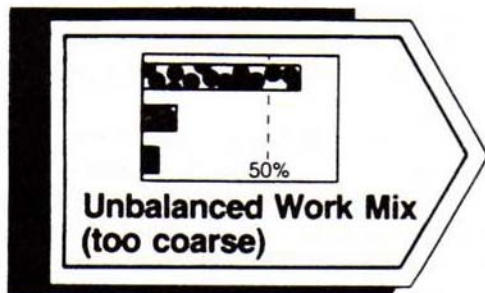
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VOLUME NO. VIII: ISSUE No. 7  
JANUARY 2003

## THE ERVIN POSTER TROUBLESHOOTING THE BLASTCLEANING PROCESS CHALLENGE NO. 2: Controlling the Work-Mix Size

To fully appreciate the importance of this challenge — controlling size-distribution of the work-mix — study the CHART featured on the ERVIN POSTER. The chart shows the effect of the THREE MAJOR CAUSES on the NINE MAJOR PROBLEMS most frequently encountered in blastcleaning. The chart shows that an “UNBALANCED WORK-MIX” can contribute to all nine major problems.

### THE CAUSE



### THE PROBLEMS

#### Substandard Quality of Finish:

Incomplete contaminant removal;  
warped or damaged parts;  
surface finish too rough.

#### Low Productivity:

Excessive blast-cycle time;  
low line speed;  
necessity for re-blast.

#### High Operating Costs:

Excessive abrasive usage;  
excessive parts wear;  
excessive machine downtime.

***An unbalanced work-mix is a prescription for disaster in blastcleaning!***

#### **What IS a balanced work-mix for blastcleaning?**

An efficient abrasive work-mix contains a properly balanced distribution of large, medium, and small

pellets. The large pellets, with maximum impact energy, must be large enough to perform the major task of loosening thick, tightly adhering contaminants, and still provide an acceptable finish (profile) on the work-piece. The small particles provide the coverage

necessary for fast removal of the lighter contaminants, and to scour and clean rust, etc., in minute surface pits and crevices.

Selection of the new, original-size shot or grit to be used automatically determines how large the largest particles in the work-mix will be. These largest particles should have sufficient impact-value to clean effectively — to remove contaminants — and still provide an acceptable finish appearance.

What determines how small the smallest particles in the work-mix should be? First, all contaminants (sand, oxide, scale, spent abrasive, etc.) **must be kept out of the work-mix.** (As little as 2% sand in the work-mix can double the wear on the blast-wheel components). Thus, the **separator system**, its condition and its operation, determines what is extracted from the system — and what remains in the work-mix.

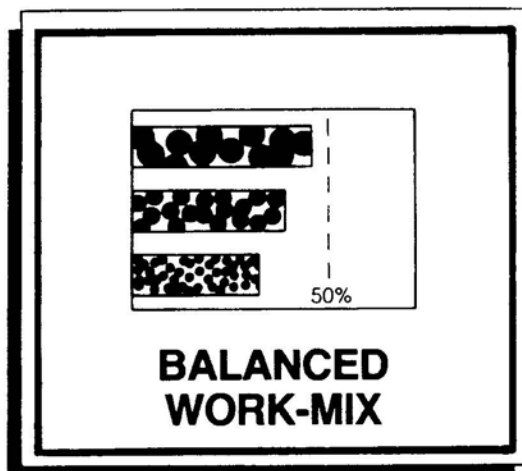
How small can the abrasive particle be and still aid in cleaning? Perhaps this is best answered by pointing out that shot as small as S-70 is effective in removing tenacious oxide scale from hot-rolled stainless steel strip — and is also used to remove scale from forged hand tools. In blastcleaning structural steel, or ship-plate, or railroad cars prior to painting, it is these extremely small particles retained in the work-mix that scour and clean out the rust in a surface with minute crevices or rust pits.

#### How is a balanced work-mix developed?

Given reasonably good assistance, via proper operating practices, Ma Nature will do the job for you.

## Guidelines for Controlling the Work-Mix Balance

Excerpted from the Ervin POSTER and shown below is the guideline section relating to maintaining a **balanced work-mix**:



1. Screen analyze work-mix weekly.
2. Add new abrasive every operating shift, and maintain hopper level above  $\frac{2}{3}$  full, always.
3. Do not allow abrasive spillage/leakage to accumulate; return to machine daily.

It's really just a case of action and re-action at work.

It has been calculated that a shot or grit particle about 1/32" in size (S-80 shot or G-25 grit), when thrown at a velocity of 250 fps, develops an equivalent crushing pressure in excess of **10 million psi** — because of the extremely small area of contact where the particle hits the work-piece. That, for example, is how the S-70 shot can do the work described earlier.

The above paragraph describes the **action**. The **re-action** is the punishing effect of all that energy on the shot or grit particle itself. After repeated impacts, it will work-harden, fatigue, and eventually, fail. It succumbs to two failure modes: fracture, and surface flaking (like peeling an onion). Fracture is the predominant cause of failure in medium and larger sizes of abrasive: The original size will fracture into halves — the halves will round up, then fracture into quarters, etc. until it reaches the size the separator removes from the system.

Thus, the size-distribution of the work-mix undergoes constant change as spent fines are exhausted and new abrasive is added. The challenge is to **CONTROL** that changing size-distribution so it doesn't swing from fine to coarse. The "how-to" is spelled out in the Guideline section of the Ervin POSTER, and by the "do-it-yourself" Ervin Blastcleaning Operations Analysis Card. Both are available at no charge from your Ervin sales representative. Review both with him — go over them, step by step, with him. He wants to help you help yourself.

4. Check Separator/Ventilating system regularly:
  - Scalp screens: Holes? Blockage?
  - Shed plates: Holes? Be sure a full abrasive curtain exists.
  - Keep dribble valves on all separator or expansion-trap discard pipes.
  - Dust Collector Pipes: check for dust build-up in pipes.
5. Check separator and dust-collector baffle settings regularly to be sure airflow is correct.

Step #1 should require no more than **one-half hour a week** for each machine — to tell whether or not your operation is flirting with **NINE MAJOR PROBLEMS** because of an unbalanced work-mix. **You simply cannot afford not doing this step.** Again, your Ervin sales representative is ready and willing to help you get started on your do-it-yourself trouble-shooting program. Let him be your starter-button. He wants customers who keep their operation on track — they stay in business longer! Use him! It's your best protection against your blastcleaning getting out of hand — and into those **nine major problems that spell disaster.**

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