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In this issue of "IMPACT" we salute a truly great PRODUCT: Ervin's AMASTEEL (unequivocally the world's best quality steel shot and grit) ---- and we salute that terrific PEOPLE-TEAM whose combined efforts and talents have made Ervin Industries the unquestioned leader of the metal abrasive industry: No. 1 in Quality and No. 1 in Sales Volume. The People-Team we salute includes each and every Ervin employee, because no matter what sphere of activity you are in, your contribution is important and valued. Our salute also extends to those employees of Ervin's many Sales Distributors who play such an important part in getting our products to our customers. WE SALUTE YOU ALL!!

"IMPACT" - - - -

was chosen as the name of Ervin's communication link between its Production, Marketing, and Management teams, because:

- ° It is strictly by the mechanical force of impact that Ervin's Amasteel Shot and Grit are able to perform such a diverse and broad scope of functions for our customers in all metalworking fields, and because - - -
- ° Those critical functions performed by Amasteel Shot and Grit have tremendous impact on life-style, U.S.A.

ON LIFE-STYLE, U.S.A.??

ISN'T THAT A MIGHTY BIG CLAIM, FOR SUCH MIGHTY SMALL PELLETS?

Like Amasteel S-660 Shot, about this size: • (approx. 1/16")
and Amasteel S-70 shot about this size: . (approx. 1/100")

The importance of the steel shot and grit industry perhaps can best be understood and appreciated if you were to try to imagine a world without the tremendous array of metal products that must be blastcleaned with steel shot or grit before they are acceptable for performance in use - - - the world as we know it today simply would not be! Read on - - - - and become a believer!

This issue of "IMPACT" is dedicated to all those of you on the Ervin team who have at some time stammered, stuttered, and otherwise become tongue-tied when trying to explain to his or her wife, husband, parents, children, fiance or fiancée, good friends, or mere acquaintances, etc., just what is the product Ervin Industries makes, and what is it used for?

Unfortunately, identifying our product as "Steel Shot and Grit" doesn't really tell anyone what it is or what it's used for. In describing our product we want to tell it like it is, but in plain English. (Not like the Pentagon did when it issued a purchase order for: " A manually powered fastener-driving impact device." Now we know why the Pentagon pays \$90 for what the purchase order described: a hammer.)

This issue of "IMPACT" deals with WHO uses our products - - - - - WHY they use them - - - - - WHAT does it do for their product - - - - - and HOW do such small, insignificant-looking particles do what they are asked to do???

Then, you'll be able to tell everyone that wants to know (and some that maybe aren't really that interested) about the wondrous things that you do to help produce or sell our wondrous products that perform such wondrous miracles to help us all better enjoy our wondrous world of today.

* * * * *

WHO?

Metalworking industries are the principal users of steel shot and grit, such as these producers of primary metals: Steel Mills; Ferrous and non-ferrous Foundries (cast metals); Forge shops; Metal Fabricators. Blastcleaning with steel abrasives is a vital and critical operation at various stages of primary metal production. (For example: blastcleaning slabs, billets, bars, rods, plate, and sheet in steel mills.) Blastcleaning with steel abrasives is also often the last major processing operation in producing an acceptable quality metal product, which may be the end-product itself, or may be a component of an assembled end-product (such as tractors, automobiles, or household appliances, etc.).

WHY? WHAT DOES IT DO FOR THE PRODUCT?

The basic functions performed by steel shot and grit used in the metalworking field fall into these categories:

- Blast-cleaning of metal products to remove surface contamination resulting from various phases of production, to provide not only a chemically clean surface, but to assist in inspection for manufacturing defects.
- Blast-profiling (surface preparation). The steel shot or grit is used not only to remove surface contaminants, but to provide a surface profile (etched, matte finish, or anchor pattern) preparatory to subsequent processing such as painting, coating, bonding, etc.
- Blast-peening with steel shot (which acts as countless mini-ball-peen hammers) to improve product fatigue-life, and to resist or prevent stress corrosion.

BLASTCLEANING:

In the case of cast metal products of the foundry industry, the as-cast surface must be blastcleaned to remove all traces of residual mold material (sand or ceramic), and those castings that are subsequently heat-treated must be blastcleaned once more to remove the oxide-scale. Surface contaminants such as these are extremely detrimental to the machining process or other subsequent finish operations.

In the case of forgings, the oxide-scale resulting from the process itself must be removed by blastcleaning. Detection of flaws such as seams and scabs is much easier when the scale has been removed. In subsequent heatings prior to drop-forging, scale removal by blastcleaning results in longer die life. When forging blanks (to be used in automotive manufacture, for example) are completely formed and are ready for the machining operation, scale removal by blastcleaning is essential; otherwise, the cutting edges of costly machine tools will be dulled, and production slowed considerably.

In steel mills, blastcleaning of slabs and billets for scale removal (descaling) prior to inspection and grinding is essential. Inspection is faster and more accurate. Grinding time is reduced, and the grinding wheels last longer.

Plate steel, and the many forms of structural steel, are blastcleaned prior to finish painting or coating so the steel surface will be free of corrosion, mill scale, occlusions, or other surface contaminants. (When painted or coated products are to be exposed in use to moisture or water, any impurity beneath the coated surface is a likely site for premature corrosion. Such contaminants tend to expand and contract at different rates than the steel itself, thus causing the coating covering it to peel or flake off rapidly).

BLAST-PROFILING:

Smooth, polished surfaces of any metal product usually cause more problems relative to paint or coating adhesion than surfaces that have been roughened or profiled by blastcleaning with steel shot or grit. The roughened surface provides greater surface area for "anchoring" the paint or coating film. Paint applied on blast-profiled steel lasts up to seven times longer than when applied over a metal surface that has rust or oxide-scale on it.

BLAST-PEENING:

In blast-peening a metal part, the work surface is bombarded with steel shot, and this cold-working process works to increase fatigue-life and prevent stress corrosion by producing a roughness on the surface and creating compressive stresses. These internalized compressive stresses offset or balance stresses caused in use of the part by cyclic stretching and relaxation, thus making the part more resistant to fatigue.

The analogy has been used that a shot-peened metal surface is somewhat similar to the loose flap of skin on your knuckle that lets you flex it repeatedly ---- if the knuckle was covered with tight, smooth skin, flexing it would cause cracking or rupturing. The basis for peening goes back many centuries. The Smithies in King Arthur's day knew that forged swords had to be pounded with a hammer to prevent the sword cracking or shattering in battle.

Depending on the peening technique used and the metal being treated, shot-peening can increase the useful life of a metal part by as much as 400%, and even up to 1500% in some instances. Blast-peening is now used for many critical heavy duty products such as propellor shafts, crankshafts, torsion bars, axles, connecting rods, helical and leaf springs, steering knuckles, etc., etc.

Proponents of shot-peening claim that if the process were more widely used it would mean stronger and lighter steel products, at lower cost than today's heavier products. These same experts believe shot-peening could be the steel industry's best hope of competing vs plastics as the material of choice in the next decade.

The same may be said for the foundry industry, where the benefits of shot-peening castings have just been brought to awareness.

LIFE-STYLE U.S.A. - - - -

One can readily appreciate the tremendous cross-section of metalworking that is processed by shot-blasting or grit-blasting for the reasons stated above. That cross-section includes metal products that have been forged, cast, stamped, rolled, welded or fabricated.

Castings produced by the foundry industry represent, by far, the largest application for shot or grit-blasting.

A bit of history: The first metal tools and weapons made by man occurred about 4500 year ago --- of hammered (forged) copper. Then man discovered that a forge fire used for reducing copper ore to be hammered into a product, would, under certain conditions, produced molten copper. That was the first glimmer of a castable molten product. By accident, man had found the ability to combine chemistry of a metal with the mechanics of casting to shape. The first molds were simple open sand molds - - - later, molds were made of sun-baked clay, or cut in limestone. The hammer used for forging had been replaced by the ladle for holding the molten metal that was to be cast to shape.

Later on, as melting furnaces were steadily improved, it became possible to smelt iron ore. This was the fore-runner of the foundry industry as we know it today. (Ervin Industries today uses electric arc furnaces to melt steel and alloys for making its steel shot.)

How important have castings been to mankind? In the year 1260, an English Franciscan, Bartholomew, wrote:

"The use of iron is more needful to men in many things than use of gold. Without iron, the commonality be not sure against enemies - - - no handiwork is wrought without iron, no field is earned without iron, neither tilling craft used nor building builded without iron."

Even Ben Franklin got in the act in 1742 when he invented his famous Ben Franklin cast-iron stove. And castings rated advertising space in an ad appearing in the Cleveland Gazette in 1820, when a merchant advised his customers that he had just received a shipment from New York that included: "Cloth goods, salt, glass, plus an extensive assortment of castings."

Today, as much as 90% of all manufactured goods are dependent on castings, whether the casting is a component of the end product or is part of the machinery and equipment used in the manufacture of the goods. And, in addition to castings, consider the other forms of metalworking such as forgings, steel mill products, weldments, and steel fabrications that are involved in the manufacture of products used in our everyday life. Then, consider this:

STEEL SHOT AND GRIT IS USED TO BLAST-CLEAN,
BLAST-PROFILE, OR BLAST-PEEN ALL OF THESE
METAL PRODUCTS!

Let's see just how broad the scope of application for shot and grit-blasting is, by considering metal products that are either the end product itself (like a cast iron skillet or a forged hand-wrench, etc.), or a component part (such as crankshafts in tractors or cars or part of the motor that operates a household appliance).

Construction: Houses(2 tons of castings alone are in the average house); Government and Commercial Buildings; Highways and Bridges, etc.

Energy: Oil and gas drilling equipment, Pipelines, Power Plants, Transmission Towers, Transformers, Generators, Motors, etc.

Food: Agricultural implements, Lawn and Garden equipment, Food Processing and Handling Equipment.

Transportation: Automobiles, Vans, Trucks, Trailers, Railroad Cars, Ships, Aircraft, Motorcycles, and Space-age Vehicles and Launching Equipment.

Of course, none of the above could be achieved without equipment used by producers of the primary metals to smelt, forge, cast, and fabricate, and without the processing equipment used by manufacturers of the assembled finished product:

Mining Equipment
Steel Mill Equipment
Forging Equipment
Foundry Equipment
Machine Tools
Construction Equipment (Excavators, graders,
scrapers, dozers, cranes, loaders, dumpers, etc.)
Farm Equipment
Oil Field Equipment
Textile Equipment
Paper-Making Equipment
Printing Equipment
Hospital Equipment
Industrial Heating Equipment
and many, many more.

AND, WE SAY IT AGAIN - - - - -

SOMEWHERE ALONG THE LINE, STEEL SHOT AND GRIT PERFORMED
A VITAL, CRITICAL OPERATION ESSENTIAL TO THE PRODUCTION
OF ALL THESE THINGS!

* * * * *

ISN'T IT HARD TO BE HUMBLE?

Now that we understand how important the steel shot and grit we, as a team, produce and sell, we have to wonder how it all came about? How do these small steel particles perform their miracles in blast-cleaning, blast-profiling, and blast-peening?

First, another history lesson:

The roots of our industry go back to something Ma Nature did years and years ago. One of our early settlers, so the story goes, had built his home, replete with window panes, in an area that was sometimes subject to severe sandstorms. The settler, didn't then invent sandblasting, he just recognized it as a phenomenon when he found his glass panes etched or frosted by the blowing sand.

But, recognition of this phenomenon did lead to the beginning of industrial blastcleaning - - - originally, sandblasting.

When? Would you believe it all started well over 100 years ago, when an American General, General Benjamin Chew Tilghman made the following claims in a patent application:

"To etch or shade glass, stone, metals and other hard materials by means of sand jet ---"

And, he covered ALL the various methods of pressure-blasting by including the following in the original patent awarded to him:

- " 1. Sand driven by compressed air.
2. Sand driven by steam.
3. Sand driven by water.
4. Sand struck by a paddle wheel.
5. Sand thrown centrifugally.
6. Sand dropped from a height through a tube.
7. Work moved against the sand. "

Pretty darn clever --- and thorough, wasn't the good old General? As you can see, his patent is the broad base from which was developed today's improved pressure blast equipment, whether used with rooms, tables, barrels, cabinets, etc., and, including abrasive propelled by air, or by centrifugal force.

Initially, sandblasting was pretty crude, with a steam jet used to propel the sand. The obvious problems: the sand getting wet, necessitating drying before re-use---and the worker's vision being obscured by the steam.

Problems such as these brought about the search for better methods. However, it wasn't until 1903 that a patent was issued covering tank-type compressed air equipment. Early tanks had no device for recirculating the used abrasive, which was just dumped on the floor. It was quite a few years later before a continuous blast-tank system, with abrasive reclamation and recirculation, was developed.

FROM "SANDBLAST" TO "BLASTCLEAN":

A problem in semantics arose when it was discovered that media other than sand could be used. It was the introduction of metallic abrasives that brought about the change in terminology from "sand-blast" to the more general term, "blastcleaning".

First reference to metallic abrasives popped up - - - when? Would you believe 1875? In an article discussing the adaptation of sandblast to industrial uses, reference was made to use of small lead shot. Twenty years later, in 1895, an article appeared that included reference to use of metallic abrasives - - - "chilled iron sand" and "steel shot". Actually, both products were chilled cast iron - - - chilled iron shot was referred to as "steel shot" from then all the way to the 1950's, when actual steel shot was introduced. Crushed chilled iron shot (grit) was referred to as "chilled iron sand", because of its appearance, generally similar to sand.

BUT---WHERE DID THIS CHILLED CAST IRON SHOT & GRIT COME FROM?

We know where the sand used in sandblasting came from, but how about the shot and grit? You sure don't find shot and grit on river banks or the edge of lakes. (Thanks be!) Oddly enough, the abrasive industry as we know it today had its origin via SERENDIPITY, which is loosely defined as stumbling upon something accidentally when you were actually looking for something else.

HAIL - - - HAIL! HAIL TO THE GRANITE INDUSTRY

Did you ever see how granite and marble building blocks were cut to size years ago? They were SAWED! Sawed with gigantic gang-saws (with mild-steel blades - - - up to 20 feet long, about 12 inches high, by 3/4-inch thick). The abrasive media used between the saw blade and the granite was---SAND! So, how did chilled iron shot get into the act?

The story goes like this: "Once upon a time."---an enterprising granite quarrier was fighting a losing battle trying to finish his block-sawing prior to his contract completion deadline. If he beat the deadline---a bonus. If he was late --- a hefty penalty clause would be invoked. He was worried!

He was imaginative, too. In desperation, in an effort to speed up the sawing, he mixed in some iron filings with his sand. BINGO! Faster sawing resulted, and he wound up with a fat bonus on his contract, not the penalty he had feared.

Did he "live happily ever after?" Maybe, but not just then. Now, he found he couldn't scrape up enough iron filings in the area to satisfy his needs for future jobs. Not one to give up, he decided he would just make his own substitute for the iron filings. And, the shot business was born! Yep, he made chilled cast iron shot!

WHEN? It had to be prior to 1895, as we know from the reference to shot and iron sand in the article published that year. WHERE? Apparently, the first shot made in the U.S. was cast in New Hampshire, in the heart of the northeast granite quarrying area. In addition to granite-sawing with shot, the quarries used shot for polishing the slabs, and to "shape-carve" incredibly delicate floral patterns, etc. for tombstones.

IRON SHOT & GRIT - - - FROM GRANITE INDUSTRY TO METALWORKING.

The adoption of metal abrasives by foundries, forge shops, and the steel industry, as a substitute for sand was painfully slow. Even though, as we have seen, chilled cast iron shot and grit was being manufactured for use in the granite industry prior to 1895, and metalworking firms had been experimenting with shot and grit as early as 1895, it wasn't until the late 1920's that its use became fairly general.

The first real take-off for metal abrasives as a substitute media for sandblasting occurred in the 1920's. That was after continuous blast-tank systems, with abrasive reclamation and recirculation came upon the scene. Now, it really became economical to use metal abrasives as a substitute for sand.

A double shot-in-the-arm (Oops, sorry about that) occurred during the 1930's - - - by the end of the decade, the shot industry was really on its way. First, strong federal laws were passed, aimed at eliminating the dread disease: silicosis. Overnight, metal-working plants were forced to stop in-plant sandblasting. The rush to convert from sand to chilled iron shot and grit was on.

Second, airless-blast units, employing centrifugal force to throw the abrasive, were introduced in the mid-1930's. The wheel-blast units were designed to use metal abrasive, not sand (Even with today's improved, long-life wheel parts, the equipment manufacturers caution against having as much as 2% sand contaminant in the work mix - - - because that small percentage of sand can double the wear rate on wheel components. Obviously, then, use of 100% sand as the blast media was never a consideration.) The early wheel-blast units, driven by a 15 hp motor, were capable of throwing 350 pounds of metal abrasive per minute at a velocity exceeding 250 feet per second, whereas an air-blast nozzle would throw only 50-60 pounds per minute (and required up to 100 hp).

The cost advantage of airless blasting vs. air-blast was fantastic, particularly for high production shops. Blastcleaning with centrifugal, airless systems quickly replaced the old methods of cleaning by rattling or tumbling castings. That, plus the enforced switch from sand, gave tremendous impetus to the growth of shot and grit usage.

When the airless-blast units first came on the market, the only acceptable media available was chilled cast iron shot and grit. It will be remembered that this shot and grit was originally made for use in sawing granite, thus, it had to be hard and friable to do its job of sawing the granite. And, hard it was - - - 57 to 66 Rockwell C!

The combination of centrifugal blasting and the hard, chilled cast iron abrasive produced unbelievable cleaning results compared to anything ever seen before. Overcleaning was rampant. The cleaning action was so severe it could make a 10 lb. casting come out of the machine weighing 8 lbs. Well, almost! In addition, it did a terrific job of tearing apart the blastcleaning unit - - - made it the original "self-destruct machine". The standard gag of the day was - - - "For every ton of chilled iron shot or grit used, the customer had to buy a ton of replacement parts for his equipment."

The obvious, logical step was to take the excess sting out of the abrasive. This led, eventually, to the development of today's cast steel abrasives. Standard hardness of the steel shot and grit is 40 - 50 Rockwell C ---- much softer than the hard chilled iron, but still harder than the metal products being cleaned. The use-life of steel abrasives was more than three times greater than chilled iron abrasives ---- wear and tear on the blast equipment was reduced by more than half ---- and cleaning is fast and effective.

BUT, HOW DOES IT DO THE JOB?

General Tilghman explained the sandblasting process this way:

"Sandblasting has best been described as an impact cleaning operation that is neither cutting, grinding, nor abrading. It is essentially a pounding, battering, or bombarding of the work surface by successive impact of the flying abrasive."

This quote still applies, except we use steel shot and grit in place of sand. To understand how this impact factor translates into the truly awesome power that does the blast-cleaning-profiling-etching, consider this:

A pellet of S-280 shot or G-25 grit (about 1/32-inch in size when thrown at a velocity approaching 250 feet per second, applies all its energy to an infinitesimally small contact area (about four millionths of a square inch), and thus develops an equivalent crushing pressure of over 10,000,000 pounds per square inch!! The best high quality steel can absorb only about 120,000 pounds per square inch.

(THAT'S THE POWER IN JUST ONE PARTICLE)

In blast-cleaning-profiling-peening we never send a single soldier (shot, or grit) to face the challenge at hand ---- we send a whole darn army. Would you believe thousands, millions, even billions?

Consider the number of pellets of shot in one pound for instance:

<u>SIZE</u>	<u>APPROXIMATE PELLETS PER POUND</u>
780	8,000
660	14,000
550	26,000
460	45,000
390	65,000
330	110,000
280	210,000
230	360,000
170	520,000
110	1,700,000
70	6,000,000

(THAT'S THE STORY OF JUST ONE POUND)

But we throw a lot more than just one pound at the work. A standard blast-wheel, when driven by a 40 HP motor, can hurl one thousand pounds (1/2-ton) every minute! A normal work-mix, when S-280 shot is used, for example, contains a mix of new S-280 shot plus worn or fractured shot particles equivalent to sizes S-230, S-170, S-110, and S-70. 1,000 pounds of such a mix means that 1 1/4 to 1 3/4 billion particles are thrown at the work every minute, with every particle traveling at a velocity of 250 feet per second, and each particle delivering its several million pounds of crunch per square inch of contact area!

(THAT'S THE STORY OF JUST ONE 40 HP WHEEL!)

... there are blast units built to accomodate wheels powered with as high as 100 HP motors, throwing as much as 2,000 pounds per minute! And then there are some huge blastcleaning installations with multiple wheels, some with as many as 10 wheels or more! Now the numbers are out of sight - - - - literally billions and billions of pellets being thrown every minute. That's why a 60-foot steel box-car, preparatory to painting, can be blast-cleaned and profiled in less than 10 minutes! See what we mean by these small shot and grit particles being the miracle-workers of the metalworking industry? Truly awesome! Makes it pretty hard for us steel shot and grit people to be humble. Right?

SOME MORE EXAMPLES OF BLAST-CLEANING-PROFILING-PEENING MIRACLES.

Shipyards: Ship units (sections) as large as 75 tons can be cleaned and profiled by blasting with shot or grit prior to painting. Formerly it took days to clean ship sub-assemblies manually for painting ----- blastcleaning with steel abrasives reduced the cleaning time from days to just minutes, and in addition provided a better anchor pattern for paint adherence.

Wire Rod: Formerly, wire rod was cleaned of rust and scale by the acid pickling process. The blastcleaning process has replaced acid pickling ----- fine sizes of steel shot and grit are used to remove all rust and scale down to virgin metal, and to provide a fine, matte finish that holds a more uniform coating, and provides excellent drawing properties for the eventual wire products. Acid pickling was not only much slower, but also attacked the virgin metal resulting in costly loss of metal. Disposal of waste acid created extremely difficult and hazardous environmental problems.

Weldments: For years, weldments were cleaned up by vapor degreasing and manual grinding and chipping. Blastcleaning with steel shot or grit effectively removes all weld slag and spatter in a fraction of the time and provides a superior etch-profile for painting or coating.

Reconditioning: Blastcleaning with steel abrasives is an integral step in reconditioning items such as auto parts (brake cylinders, brake shoes, clutch components, water and fuel pumps, shocks, and starter drives), oil and gas pipe, steel drums and containers, water and gas meters, tractor parts, rock drill bits, sprockets, etc., etc. Blastcleaning does in a fraction of the time what was formerly done laboriously by wire brush, chipping, grinding, scraping, and acid wash.

Rubber Bonding: When rubber is to be bonded to metal (vibration control mountings, for example) an absolutely clean surface, plus good etch profile is required for insuring a permanent bond. Blastcleaning is the answer to this challenge.

Deflashing Molded Plastic or Rubber Parts: Blastcleaning with the smallest shot sizes can accomplish removal of the flash effectively and rapidly, although use of non-metallic media is more common. Where manual deflashing, in one instance, required an hour to process 1,000 parts, blast-deflashing processed as many as 5,000 parts in less than 10 minutes.

Peen-Forming: The shot-blasting process is used to create form (such as aircraft wing panels). Peen-formed parts are shot-peened on one side only utilizing large-size steel shot. Forming is accurate and precise. After forming, the wing skin is smoothed by sanding for aerodynamic and aesthetic purposes, and is then compression peened with small S-230 steel shot to increase fatigue strength and provide resistance to stress corrosion.

Roll-Etching in Steel Mills: In this Blast-profiling operation full-hard (65 Rc) steel grit is used to produce a precisely controlled etch surface on the hard steel rolls used for production of cold rolled steel sheet. The specific roll surface profile, after etching, is dictated by the surface finish requirements of the ultimate end-use product ----- i.e., steel for automobiles, appliances, etc. In the subsequent rolling process, the pattern on the rolls is transferred to the sheet surface (about 1/2 the roughness value of the roll surface). Providing the required etch on the extremely hard rolls is one of the most difficult and demanding challenges of the blast-profiling process.

BUT, THAT'S NOT ALL - - - - -

Thus far, we have dealt only with applications for steel shot and grit where the force of impact (due to being impelled at a velocity of 250 feet per second and delivering several million pounds of energy to the point of contact) was the key to performing virtual miracles in blast-cleaning-profiling-peening. But, there are a myriad of non-blasting applications for steel shot and grit, some of which again defy imagination.

Specially sized shot as small as S-110 and S-70 are used as the carrier for the developer in copy machines such as Xerox, IBM, etc., both in the original equipment and as replacement.

In reviewing the history of our industry, we saw that the first, the original application was for processing granite (sawing, polishing, shape-carving). This application has had a resurgence in recent years due to the advent of a new breed of saws using extremely thin alloy steel blades capable of sawing (with a relatively fine size steel grit) as many as 100 thin slabs from one block of granite. These granite slabs are then polished and become the beautiful granite facing seen on so many modern buildings. The grit used is as hard as we can make it (65 Rockwell C) ---- it has to be, in order for its abrasive characteristics to attack hard granite.

The granite application, and many others, utilize the abrasive factor of steel abrasives, such as the following list of uses for shot or grit:

- Grinding agent for producing Paint Pigment
- Non-skid agent in flooring materials
- Truing and Siding Grinding wheels
- Mix component for bonded grinding wheels
- Mix component for bonded Railroad Brake-shoes.
- Media for core-drilling for highway testing, etc.
- Grinding agent in agitated bed (jigs) for Gold Ore.
- Media for mix with compounds in Burnishing Machines.

the heavy density of steel shot and grit (250-300 pounds per cubic foot, depending on size and shape) makes it extremely useful for ballast or weighting applications. Its free pouring characteristic is also an important feature. Uses include:

- Ballast in cranes, hoists, elevators, etc.
- Media in cement slurry used for Radiation Shielding in atomic reactors.
- Used as a back-up agent to support shell molds used in the foundry casting process.
- Media to clean boiler tubes in Power Plants.
- Ballast used for deep sea submersible vessels (released when ready to rise to the surface).
- Used as weight media for exercise and therapy weights.
- Ballast weight for countless items such as lamps, ashtrays, etc. etc.

Steel shot and grit also have excellent heat-sink (heat absorption) properties, and thus has application in steel mills for capping molten ingots, and for use in preventing molten metal wash-out in mold stools or runners.

The magnetic properties of steel abrasives permits its use in Seed Cleaning. Fine steel grit is introduced into a chamber where seeds are in suspension ----- weed seeds have a mucilaginous coating that attracts the steel grit particles. Then, by using magnetic separation, those weed seeds are separated from the good seeds.

The very finest steel grit particles are used in production of fireworks, railroad flares, and as a scarfing powder for flame-cutting of steels.

A use for steel shot that one might think to be natural has thus far escaped us: Steel Shot for Shotguns. The Government has made use of lead shot illegal for waterfowl hunting (lead shot falling in the lakes and ponds poisons the birds), so steel shot (made by ball bearing manufacturers) is being used more and more. Our steel shot, by reason of the Chemistry required for blast-cleaning-profiling-peening applications, is too hard for use in shot-guns because of excessive barrel-wear. It is quite possible that gun and/or shell manufacturers will develop barrels and/or shell casings or wads that will permit use of our shot in the years to come??

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A LOOK TO THE FUTURE

As we have said, the myriad of uses for steel shot and grit, both as blast-cleaning-profiling-peening media and for the host of non-blasting applications absolutely defies the imagination.

Certainly, we have seen the proof of our first page statement relative to the impact (of the products that we of the Ervin Team make and sell) upon lifestyle - U.S.A. Our recitation of uses for our products clearly tells us ---- it shouts loud and clear ---- that there will always be a market for steel shot and grit.

Our strong involvement with the metalworking industries might lead to the feeling that we are in a no-growth segment of the economy ----- particularly because of the negative aspects of recent events in the steel industry and the automotive industry. Old, inefficient plants have been closed, with more closings scheduled in the near future. Media stories about the "Rust-bowl", the "sick and dying smoke stack industries" and the "Import-Invasion" and Trade Deficit, all certainly do give us pause for thought. The pressure on the auto industry to cut down the weight of its cars by downsizing and by substitution of lighter materials for steel and ferrous castings, has had severe impact on the U.S. metal working industry - - - - and, we, as suppliers to that industry, have likewise been affected.

However, on the positive side, we are seeing signs that the automotive industry, the steel industry, the foundry industry, the forging industry, have all got the message. They are serious about recapturing the U.S. earlier No. 1 Position on Product Quality, the world's highest Productivity rating, and being cost-competitive. Closing old, inefficient plants is a painful part of the process.

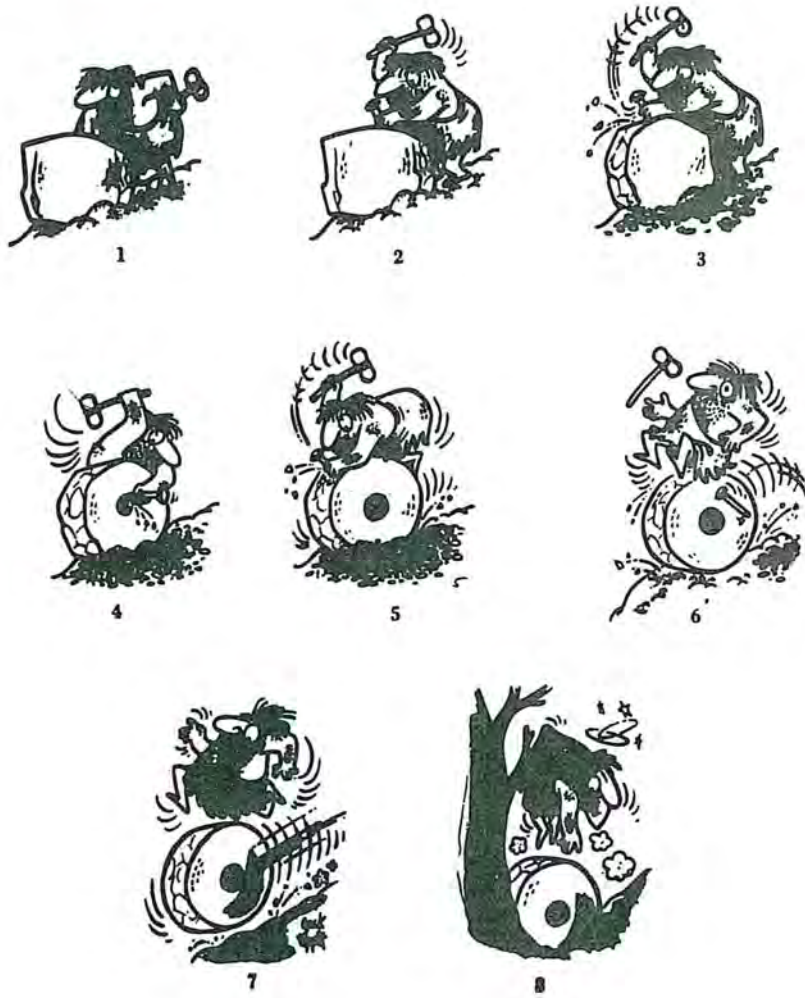
Don't sell America short. The metalworking industry is on its way back ---- not fast, not easy, but clearly on its way back. And, as it rebounds to its former position as world leader in quality, productivity, and cost-competitiveness, our steel shot and grit industry will grow even stronger, more viable, more profitable ---- IF, but only if, we in our industry strive for those same goals relative to quality, productivity and costs.

We are cross-section America. The wide scope of applications we've listed proves that beyond doubt. Just as there will always be need in the U.S. for the products of agriculture, for housing, for the wheels of transportation, and for all the good things we expect in today's lifestyle-U.S.A., there will always be a market for our world's best quality AMASTEEL SHOT AND GRIT!

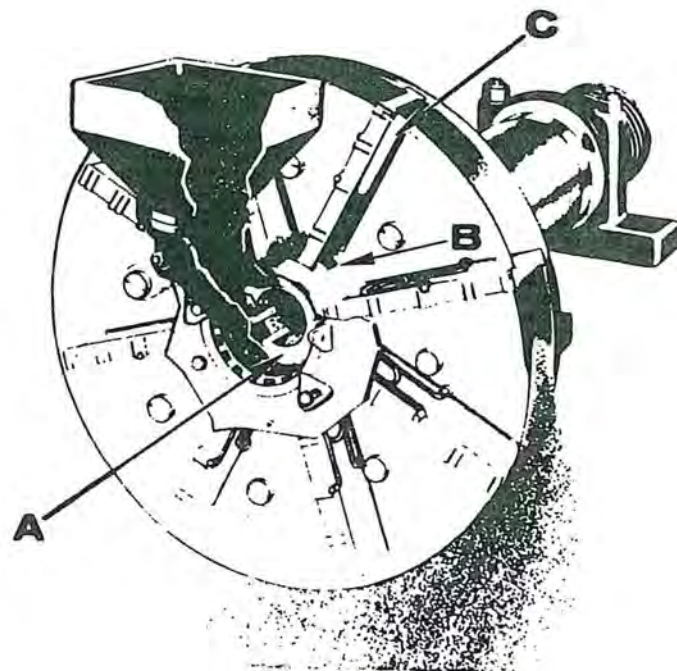
Einar A. Borch, Editor
ERVIN INDUSTRIES, INC.
Ann Arbor, Michigan
December, 1986

P.S. Ye olde Editor has been involved with the wonders of the shot and grit industry since 1933 --- those very early days of the history of the industry. Having been reminded, from putting this story together, what a unique and interesting business this is:

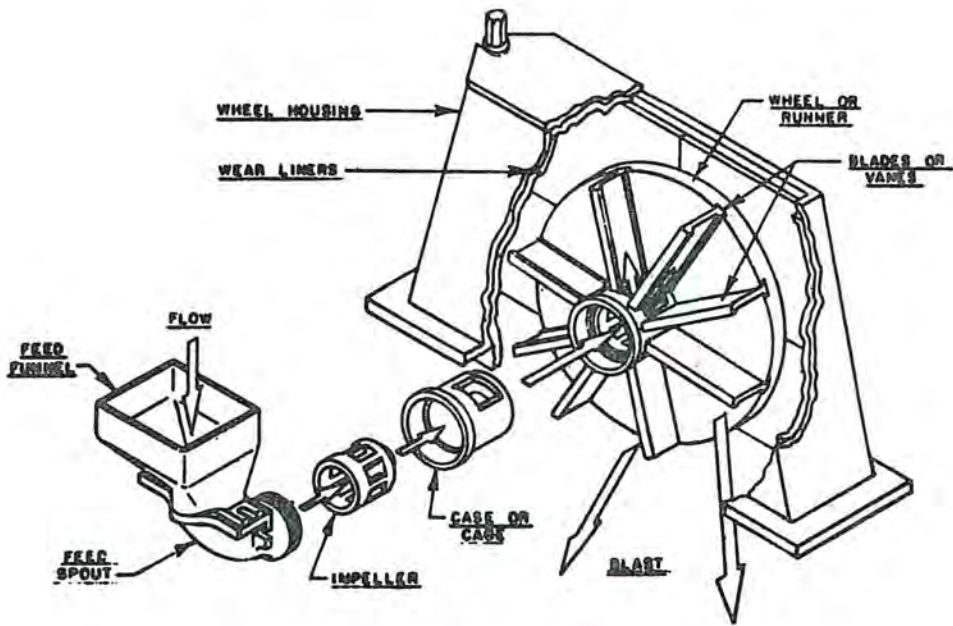
1. I think I'll buy a ton each of shot and grit just to store in the garage. That stuff is so terrific!
2. Having enjoyed this last 50-plus years in the business, and seeing all that's happened in that time-span ----- I think I'll stick around for the next 50 years. I can hardly wait to see the changes to come!



PROGRESS

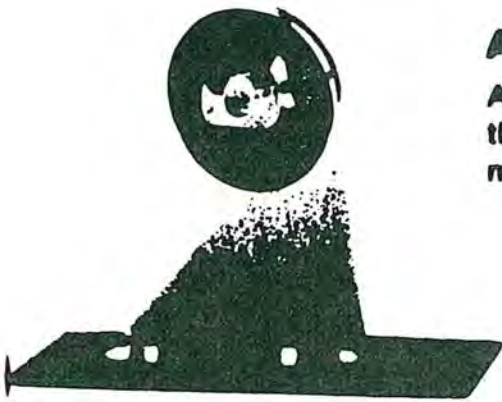


BLAST-WHEEL



AIRLESS BLAST CLEANING WHEEL UNIT

BLAST WHEEL COMPONENTS



ABRASIVE FLOW

Assuming that an abrasive wheel throws 1000 pounds of abrasive per minute:

- a) Normal S550 work mix has an abrasive flow of 1/2 to 3/4 billion pellets per minute;
- b) Normal S280 work mix has an abrasive flow of 1-1/4 to 1-1/2 billion pellets per minute