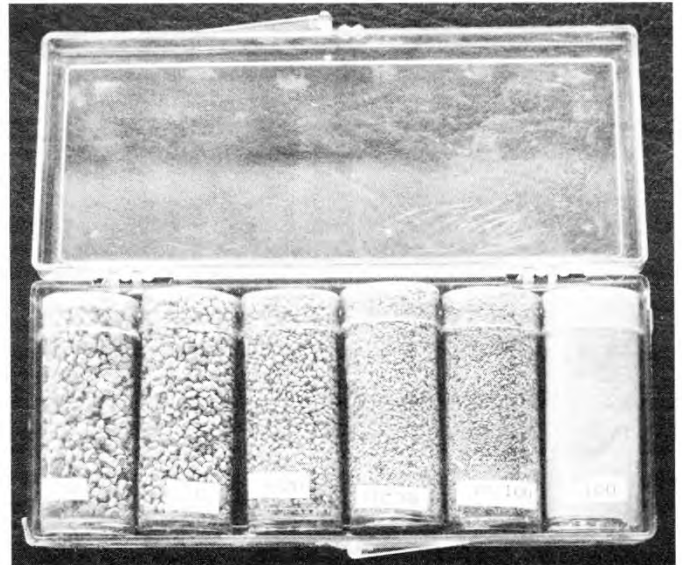


SHELL BLASTING

Determined to clean up your engine cases?
Discouraged by limp suds and lazy solvents?
Tired of abrasive pastes and steel wool?
Scared of blasting with sand?
Terrified of glass beads?
Then try walnut shells.
By Phil Schilling



Walnut shells come in several grades suitable for different cleaning tasks.

● Aluminum alloys are more energetic than most people, and that's why keeping motorcycle engines looking new is a losing proposition in the long-term. This highly reactive metal stays busy all the time turning itself into aluminum salts and oxides. Those who get their motorcycles near wintery highways know what road salt can do: a case of instant corrosion-pocks. For the same result in the land of perfect sunny days, just show your motorcycle the Pacific Ocean.

Many motorcycle enthusiasts will never be bothered by grubby engine cases—because they don't keep bikes long enough for the clear paint on the engine cases to chip, rub off or wear away, or because their motorcycles are long gone before unpainted aluminum castings become oxidized and dingy.

But perhaps you're not a bike-of-the-month owner whose enthusiasm evaporates as the warranty expires. Suppose that you've grown attached to a particular motorcycle and want to refurbish its engine, which probably has acquired a very secondhand appearance. Perhaps you've bought a rotting clunker to restore, or maybe you're just a racer or rider with a Mr. Clean Mind—and you can't stand an engine with castor-oil stains or aged and discolored castings.

Suds and solvents, aided by abrasive pastes and pads and elbow grease, reach a point of diminishing returns. True, polished alloy and good chrome can be buffed up almost indefinitely, but rough aluminum castings (including those sealed with clear paint) will in time begin to look tacky. Dangerous flammable solvents are commonly used to keep castings clean, but even if you don't ignite the stuff, solvents like lacquer thinner are



Inside the cabinet there's a whirling storm of walnut shells cleaning every exterior pore of the engine cases. It's more expensive and effective than solvents.

hard on skin and eyes and lungs. Non-flammable cleaning agents won't explode, but you'll still wish you had a pair of leather hands and a set of lungs to match.

Mention blasting to most people and think of sandblasting. A high-pressure, coarse-grained sand treatment will strip dirt and grime (and oxides) off aluminum cases by removing metal. Sandblasting will rip through Honda engine-case paint—and that of any other brand; so if you want to rough-up the cases and homogenize all surfaces, then sandblasting may be appropriate.

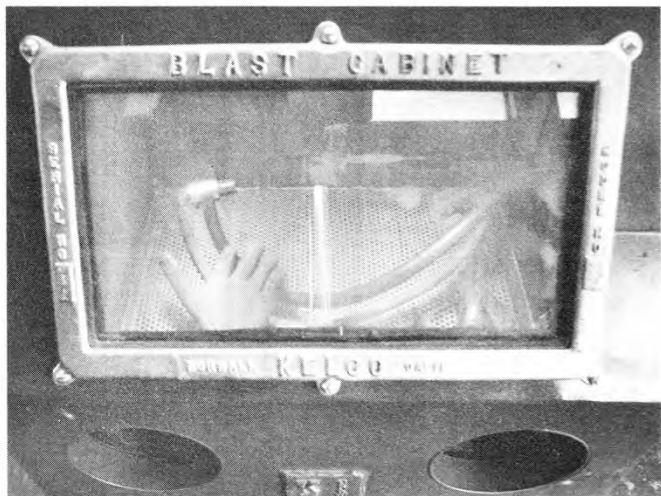
Glass-bead blasting is another alterna-

tive. With proper equipment and bead sizing, the engine cases won't be torn up in sandblast fashion. Engine paint will certainly go, but you won't be left with a one-eighty sandpaper finish. On the contrary, a finely beaded surface will allow you to repaint the cases.

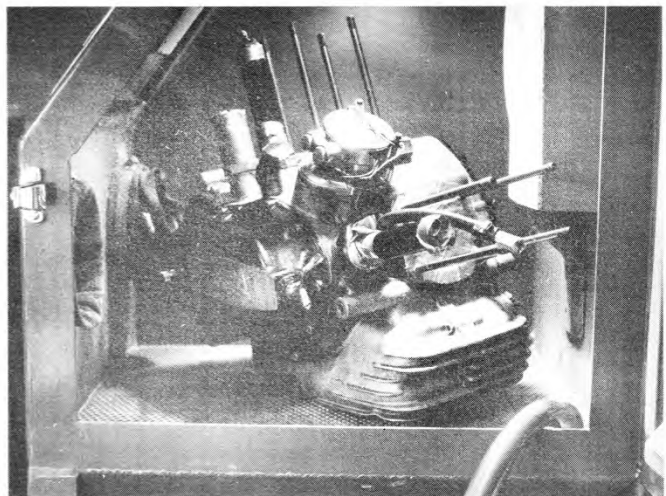
Glass beading has its drawbacks. Unless you're careful and use low pressure and small beads, you can change the texture of the blasted part. Many restorers want only to clean a surface; they do not want to erase the as-cast textures or homogenize the surfaces. Glass beading has a more serious problem. Unfortunately the beads shatter on impact, turning into a fine silty dust which gets into the treated surface. You must be scrupulously clean when working with glass beads, washing the finished surfaces in a solvent tank and then drying the pieces with compressed air. A sloppy clean-up can lead to a later disaster: more than one rebuilt engine which has had glass-bead (or sand) powder left in oil passages or bearings or casting flaws has self-destructed shortly after being started.

Considering the potential for disaster, you can't afford to leave any bearings or seals in a casting which will be blasted with sand or glass beads. Obviously, a bearing or seal will be destroyed instantly if accidentally hit by a pressured stream of sand or glass. And clearly, even if you remove all bearings and seals but fail to clean the cases thoroughly, grief can still be yours.

Shell blasting, or more properly "soft abrasive grit," is a better deal. The term "shell" covers a vast range of media, including cherry pits and almond shells. But the most useful soft grit, so far as the motorcyclist is concerned, is pulverized



Front view of the blast cabinet reveals long rubber gloves to protect hands inside; one hose carries air to the spray nozzle, the other carries syphoned-up media.



Most blast cabinets aren't quite this large. The engine cases have been gutted and the shortblock reassembled; all openings have been carefully taped and sealed.

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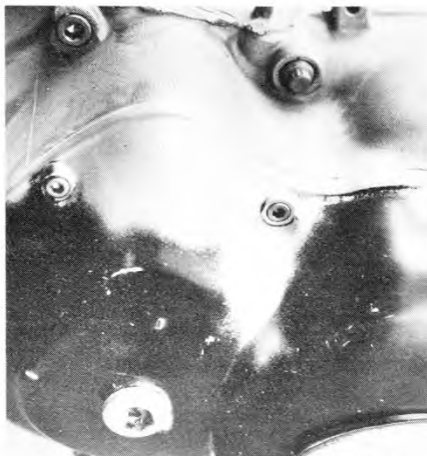
walnut shells. This soft media comes in several grades: one size is used to degrease delicate electrical equipment, another size cleans up jet engines, etc.

Walnut-shell grit has certain advantages over other soft media. Walnut grit is resilient; that is, the pieces of grit are capable of recovering their size and shape after being deformed under impact. Cherry pits, on the other hand, hit a hard surface and then disintegrate into fine powder, not unlike glass beads.

Walnut-shell grit is abrasive enough to clean a surface, but not abrasive enough to alter texture. The grit will get oil and dirt out of metal pores and brighten aluminum engine cases. And the grit will remove most common engine paint, though it won't touch polyurethane-based paints which have been almost bonded to surface of the metal.

Soft abrasive grit won't destroy bearings and seals like glass powder or sand. Indeed it's possible to remove an engine from the frame, carefully tape off all intake and exhaust tracts and breather lines, and then blast the exterior with walnut shell abrasives—providing you can find a blast cabinet large enough to accommodate the engine. Chances of finding such a giant blast cabinet are poor, so that means pulling the engine down, removing the internal parts except seals and bearings, reassembling the empty cases of the short block, taping over any openings, and blasting away with walnut shells. You wouldn't want to try this short-cut with glass beads which can lift tape and then contaminate the bearings inside.

Since walnut-shell grit is much larger than glass beads, and since the grit doesn't shatter into a fine powder, taping



Walnut shell blasting would remove flat-black finish aerosol-painted on left sidecover. Blasting wouldn't touch baked and bonded paint on right side-cover.

suffices to seal off the interior of cases. And there's some margin for error. While walnut dust isn't desirable to get in bearings, at least it won't destroy them.

In most areas of the United States, there's no problem finding a sandblaster. More difficult is locating someone to do bead-blasting, though specialists can be found in almost any industrialized area. The toughest task is ferreting out some firm which uses walnut shells because soft abrasive mediae are not as widely used as glass beads. Walking through the yellow pages may only run up your phone bill and run down your patience.

We suggest another approach. Drop by a local machine shop and simply ask someone to recommend a blaster. In our case, Ken Dieter, who does much of the special machine work for Cook Neilson's Ducati Desmo, and who is President, Chairman of Board and Head Broom-Pusher of Dieter Engineering, offered an

immediate suggestion: J&P Precision Deburring in Canoga Park, California.

A phone call and a quick investigative trip confirmed that J&P had the equipment to shell-blast. The blast subject was the Ducati 750/883SS, well-used at Daytona 1976. In fact these particular engine cases have been used without interruption since 1973, and despite a lot of manual scrubbing and solvent dipping, the main engine cases looked scaggy, showing a certain amount of Castrol R dinginess. So the Ducati cases were perfect candidates for a walnut clean-up.

With the interior gutted, the short block was reassembled, and all openings were taped shut. Considerable care was taken to seal off the holes left by the removal of the secondary transmission shaft (which carries the countershaft sprocket on the right side) and the hole left by the shifter-drum shaft.

J&P managed to fit the whole short block into a huge dry-blast cabinet with a syphon-type delivery system. The grit was size used to blast jet engines, and in a short while the cases came out with renewed luster. At \$25, the job was pricey and difficult compared to a can of solvent, but blasting gave neater, cleaner results.

Next we vacuumed the exterior, pulled out the rags from around the countershaft area, and then removed the tape. The cases were split, but no walnut dust had invaded the interior. All bearings were free from grit, and spun normally. Oil passages were free from any signs of grit or dust.

Walnut-grit blasting is an effective and direct method for cleaning up the cases. For refurbishing or restoration, shell blasting is an obvious step. An engine with a spotless exterior certainly goes no faster than a grubby one, but the Mr. Clean Machine is more pleasant to work on. ●