The Harsh Effects of Machining Engine Parts

Iding and Power Techniques. W

Several processes are used to machine engine components. We have discussed the accuracy and the correct methods of engine part machining, but we have not talked about what is actually happening to the metal we are machining and how that affects the final surface finish and outcome. The most common methods of machining engine components are cutting, grinding, honing, and polishing. All of these processes require adequate tooling and procedures but what we are going to examine is what is actually happening to the metal itself.

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BY SCOTT SEHR

The cutting processes we use in boring cylinders, cutting valve seats, surfacing heads and blocks, and machining pistons all use different forms of tooling and cutting bits. These bits come in many different configurations and materials. From the naked eye they appear to be cutting the engine material, leaving a nice surface to be used as-is or finished for a specific use. When the metal is examined closely and magnified, it is

evident that the tool bits are actually tearing the metal away in a more violent manner than what the naked eve perceives. Using the correct bit material and cutting speed can change the finish, but it is still just tearing the metal. Our grinding processes used in grinding crankshafts, valves, valve seats, porting, and certain engine part surfaces require different stone material and grits. These grinding procedures also depend on proper speed, pressure, and stone sharpness but what is actually happening to the metal is the stone is ripping the metal away. The grinding finish can be quite different from the cut surface when examined under magnification. The surface left from grinding will have a directional tail from the ripping motion in the direction of the stone against the part. Our engine honing procedures that are used in cylinder finishing, connecting rod reconditioning, pin fitting, align honing, lifter bore, and valve guide finishing are similar to grinding because stones are used but a honing fluid is used as well. Using the correct honing stone grit, compound, and hardness is critical in the final surface finish, but the stone ripping of the metal is still evident. The use of the honing fluid keeps the stone lubricated, cool, and pulls the microscopic metal debris away from the work providing a cleaner and smoother usable finish. Our polishing processes that are used to final finish components for use in the engine still have an abrasive effect on the metal. The result of polishing on the surface is very fine and properly prepares the surfaces for use.

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Knowing what is actually happening to the metal that is being machined is the first step in the knowledge of preparing the part correctly for its intended use. Here at Sehr performance we have always studied the science of machining and proper preparation. Our customers can count on us to always go the *"Extra Mile"* when we move the metal to make power for their hot rod.



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