

# Mini-Strips Will Solve Problem

It was recently brought to my attention that many engineering drawings stipulate to shot peen all over a part's surface to a given intensity. Because the engineering drawing always takes precedence over a specification, I believe this is a problem for all shot peeners that has been overlooked since the beginning of the shot peening industry.

AMS-2430-R, section 3.2.1.4, states: "Each set-up shall be qualified for each part number. Either a scrap piece or representative fixture shall be fitted with sufficient test strip holders oriented essentially in the same manner, with the same surrounding features as the part, to represent the actual designated surface. Peening time and a saturation curve shall be established for each Almen test strip." To the best of my knowledge, this has been the standard practice throughout the shot peening industry to measure the intensity on any given part. However, in my opinion, this section leaves us in a precarious situation. Who decides what number constitutes "sufficient test strip holders" or determines test locations that are "oriented essentially in the same manner"? More importantly, how can such a non-defined requirement be reliably audited?

According to the Defense Contract Management Agency (DCMA), anyone performing shot peening to a drawing that "states shot peen all over to a given intensity" must verify intensity on *all surfaces all over*. Sampling the intensity in select locations is a direct violation of the engineering drawing. Current methods of intensity verification make this both impossible to do and technically impossible to certify.

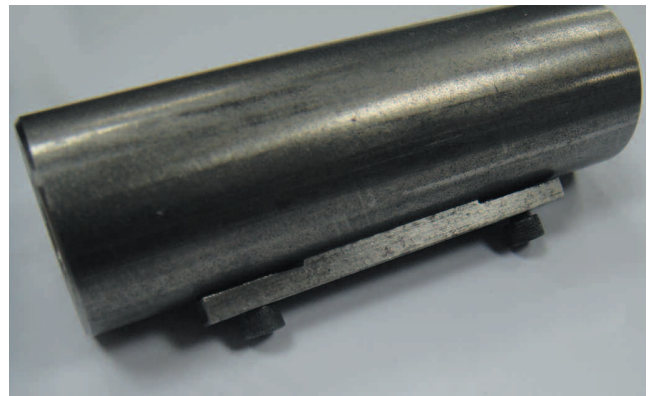
Where does that leave the shot peener? A new solution is available. Over the past few months, Peening Technologies has been evaluating Electronics Incorporated's new Almen mini-strips for potential use in our job shops. Shot peening intensity verification has always been a problem in hard-to-reach areas or areas that are smaller than the standard Almen test strip. Often expensive and complex test fixtures

are made or a scrap part is cut up to install Almen holders for standard Almen strips. If a scrap part is available, these expensive, complex test fixtures will be a thing of the past. All one has to do is to affix the EI Almen mini-strip to the desired surface using double-sided tape. Testing is still necessary to validate the correlation between mini-strips and standard strips, but I can see the day where intensity can be accurately and easily measured in areas that may have never been measured before. While this alone will not completely solve the problem of verifying intensity all over, it does provide a much more detailed idea of what is happening to the part in areas that were not previously tested. Couple this verification method with a closed-loop CNC/Robotic shot peening machine, and you can further enhance the reliability and repeatability of the process.

Due to the recent DCMA finding, parts designers (at least for the U.S. Military) are likely going to have to revise old drawings to detail the locations for intensity measurement and do the same on future designs. Ironically, the now-cancelled Mil Spec Mil/AMS-S-13165 Section 6.2 Acquisition requirements paragraph G specifically stated: "Designation of locations to be peened (**including intensity verification areas**), or locations to be free from peening as applicable." This was rarely if ever done in practice.

It is this shot peener's recommendation that designers specify the following on their engineering drawing:

- areas requiring shot peening,
- areas where peening is optional and may be incomplete,
- areas where peening is prohibited,
- areas where intensity verification is required (preferably with a diagram detailing Almen strip holder orientation),
- peening media and hardness to be used (give a range if possible), and
- amount of coverage. ●



Shot peening technicians at Peening Technologies in Connecticut constructed this test fixture to simulate a component that requires lance-peening of a hole. To the left is an EI Almen mini-strip attached to a holder with double-sided tape. Above, the strip holder has been attached to the fixture with the mini-strip facing inside the pipe.