DIAMOND SCRATCHING IN FINISH

Source: Raytech Shaw Manual
Appendix III The Causes of Scratching

Lap Contamination

The appearance of unwelcome scratches on a facet while it is being polished is a problem which from time to time nags both amateur and professional alike. While it is sometimes difficult to identify and eliminate the cause of scratching, the following outline of some of the possible causes may be helpful in eliminating the problem if it should arise.

One of the most common and easiest to identify causes of scratching is the presence of an embedded particle in the polish lap, If the scratching occurs in one portion of the polish lap only, an embedded particle of abrasive grain, a metal sliver or a small particle of gemstone is probably the cause. Sometimes a careful examination of the problem area in the lap will locate the particle, and it cache picked out of the lap surface with a knife point or razor blade.

Scratching caused by lap contamination can be minimized by careful handling and other sealed containers. It is a good practice to thoroughly clean the surface after the cleanliness. Polish laps should be stored in their own individual clean plastic bags or cutting steps are completed and pr or to polishing, so that no grit remains on the machine. The hands, fingernails, sleeves of clothing, as well as the overhead lamp, are possible sources of grit contamination.

Residual Scratching from Pre-polish

It is the function of the polishing operation to remove the fine scratches remaining from the pre-polish step. The scratches present on a facet may be scratches as yet un-removed from the previous step or else they may be new scratches created by the polishing step itself. If the polishing direction on the final facet is arranged so it is at right angles to the pre-polish direction, then the direction of any scratches observed will reveal whether they are new scratches being formed or residual scratches as yet un-removed. If the scratches present are those remaining from the pre-polish step, ft the cause may have been contamination of the pre-polish lap. If the pre-polish lap has a tendency to scratch over Is entire surface, and especially it if it is new; it will probably benefit from being broken in by hand grinding a rounded lump of hard material such as corundum or possibly even agate.

Loose Grit Contamination

Loose grit, coarse polish particles or polish agglomerates can also cause scratching. This cause is eliminated by simply scrubbing clean the lap and the stone. Coarse particles and agglomerates can be eliminated from the polish by suspending the polish in water and using only the portion of the polish that remains suspended and not the coarse portion which falls quickly to the bottom of the container.

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Scratches Generated by the Polishing Action

Probably the most troublesome scratching and the least understood is that created by the interaction of the lap, the polish and the gem. This kind of scratching is most common in certain troublesome stones, such as the quartz gems, and is more likely to occur on large facets such as the table. The occurrence of this type of scratching is not consistent but seems to occur with some stones and not with others.

Without attempting to theorize as to the mechanism by which the scratching takes place, it does seem to be caused by a seizing and a Mating of the stone surface and seems to be aggravated by high lap speeds and high polishing pressures. Reducing the lap speed and pressure will often eliminate the problem, but of course these steps add to the time required to polish the surface. To reduce the total time required, it is often worthwhile improving the quality of the pre-polish by using a Nu-Bond 1200 grit lap, or Dimafast P 3000 grit lap. The use of "Ultralaps" will often eliminate scratches when all else fails.

When scratching becomes a problem during your usually successful polishing operation, a complete and thorough cleanup is usually worthwhile. The lap can be cleaned by scrubbing it vigorously with a stiff bristle brush in all directions under running water. Place it on the arbor only after cleaning the arbor, the lamp and the splash shield. A plastic or metal lap can cleaned by scraping it. The lap can be scraped with a sharp, stiff backed razor blade as shown in Figure 38 while lap is rotating approximately 300 RPM, first in a reverse direction opposite to that used in polishing and then in the polishing direction.

Tilt the blade slightly as shown and apply sufficient pressure to actually remove some of the lap surface. Scraping in this manner is also good practice to help keep the lap surface flat and smooth. If a clean up does not clear up scratching, the problem may be due to deep scratches incurred during rough or fine cutting. A Standard operating procedure is to cut crosswise of the facet during coarse and fine operations, and lengthwise of the facet during polishing. If scratches appear crosswise of the facet then you know they were made during cutting; if they are lengthwise of the facet, they were Caused by contamination in the polishing lap.