



0 - 4 Represent the appearance of misaligned facets

FELT-TIP / POLISHING TECHNIQUE

When a designer is confronted with a need to determine how an existing stone "might have been" produced and the usual cutting information is not available, one way is to actually measure the stone (or model) with conventional tools ... optically with devices like comparators, or mechanically with micrometers. However, there is a much better way that faceters can utilize ...e.g. use the FACET MACHINE itself to make measurements of the cutting parameters. One needs to know which bearing indices and angles were used. This is exactly the information a facet machine can deliver.

To begin the process dop the stone (or model) in the standard way except a temporary adhesive can be used since the stone (or model) will not be treated roughly. Insert the dop into the quill as usual, but before tightening whatever holds the dop, select a REFERENCE FACET and orient the stone so this facet will touch the lap when the index gear is in its highest index number i.e. 96 on a 96-gear, 64 on a 64-gear, 120 on a 120 gear. For convenience, the REFERENCE FACET will be the first one to be located because, if we are lucky in our choice of Index Gear, the cheater setting for all facets after the REFERENCE FACET can be ignored. A nice simplification if it works.

If precise and accurate information is to be obtained it is essential that we have a way to determine when a particular facet has been exactly located. This is the function of FELT-TIP/POLISHING which is simply an adaptation of a facet-locator system that we use in regular polishing. Using a felt-tip marker pen the area around the facet in question is smeared with ink so that it appears dark like Figure 0. Then with a polishing lap (any smooth lap will do) in place but not rotating, bring the stone to the lap by adjusting the facet machine controls ... height adjustment, index gear setting, angle, and cheater. Gently touch the stone to the lap then "rub" it until some or all of the ink is removed, but not so hard or so long that any damage to the original facet surface occurs.

Then look at the facet. If the ink has been removed uniformly as in Figure 5 the facet is perfectly aligned and you can record pertinent information ... angle, bearing index, height. However, if the ink was not removed uniformly it indicates some misalignment.

For example:

Fig. 1 where ink has been removed preferentially from the lower part of the facet, indicates elevation angle is probably too high or height adjustment is too low.

Fig. 2 where ink has been removed preferentially from the upper part of the facet, indicates elevation angle too low, but the facet is otherwise centered.

Fig. 3 and Fig. 4 where ink has been removed not only upper/lower but also left/right, indicates both angle and bearing adjustments are needed.

If the facet was not properly aligned, adjust the facet machine controls add more ink to the facet, and check again. This process is repeated until you find you are "on the facet". Then and only then save the information ... angle, bearing, cheater setting, height. Now you can proceed to other facets on the stone until enough of them have been identified and located so you can recognize the pattern. Symmetry of design and grouping of facets which have the same height adjustment can simplify measurements, but locating facets in TERMS OF NORMAL FACETING MACHINE PARAMETERS is the greatest benefit of the FELT-TIP/POLISHING technique.

Usually just locating a facet is all that is needed for cutting and polishing. Angles to 0.1 degree and bearing information to the nearest index gear will suffice for this. However, both Robert Long and I use computers to fine tune the design by verifying the information to a much higher precision. Generally we expect angles to agree within 0.00001 degree and bearings to the equivalent of .00005 degree. No, we cannot cut and polish that accurately with our existing equipment, but if it checks out that well there should be no problem in executing the design to a precision one can see with only 10X magnification.

See page 1 of this issue for a design which Robert Long verified in this way. A fine large diamond had been cut by Basil Watermyer, who furnished photo, sketch, and plastic model to Dr Henry Owen who passed them along to us. Since Mr Watermyer is first and foremost a diamond cutter a bit of translation is needed if the design is to be implemented on our non-diamond cutting traditional equipment.

In Watermyer's words ... "Though I had drawn the 'Split-facet Barion Oblong Cushion' nearly two years ago, faceting it was another story. It is not recommended to sort out the techniques of a complex new cut on

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