

ECED FACET DESIGNS

The term "ECED", as we use it, is an acronym for Equal Center to Edge Distance. When applied to preform (shapes) it is the simplest of all preforms - - - one in which NO HEIGHT ADJUSTMENTS are needed during the cutting of the outline after the first (arbitrary) one is selected. Just set the elevation angle adjustment on the faceting machine to a convenient angle, lower the stone to the lap, and start cutting. If the initial angle is not 90 degrees, then an additional shaping step is needed to form the outline, but it also is made at constant height adjustment.

either too deep or have a shallow angle which leaks too much light thru the pavilion.

We have published many ECED designs in SFD for example: 24.006 ECED TRAPEZE B and the new triangle design on page 3 of this issue. The entire list of possible regular polygons for 3 to 12 sides was published in SFD Mar 80 and Fred Van Sant has many ECED designs in his books "Star Cuts I, II, and III". The subject has been covered in several of the Northwest Facetor's Conference programs.

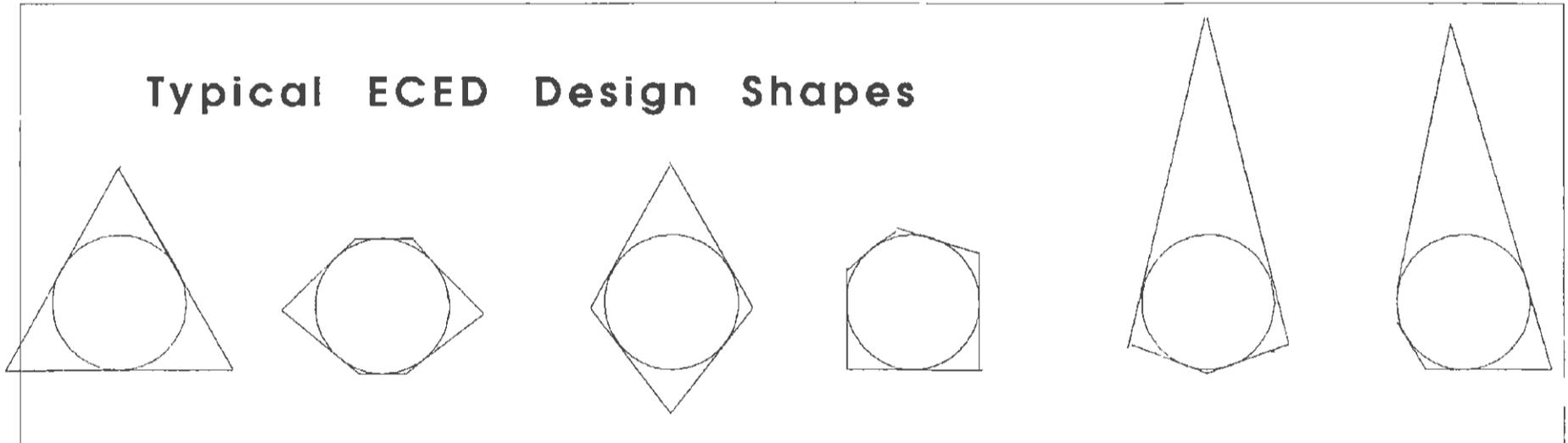


Figure 1: Typical ECED Design Shapes

Figure 1 shows some "Typical ECED Design Shapes". The characteristic they all have is that the facets that form the outline are geometrically tangent to a defining circle. On a facet machine this implies that these outline defining facets are all equally distant from the center i.e. they are ECED and the facets can be cut at a common height adjustment. All regular polygons can be cut in this way as well as a large number of shapes such as **LOZENGE, CUT CORNER TRIANGLE, ISOSCELES TRIANGLE, TRAPEZE, KITE, CALF'S HEAD,** and numerous non-symmetrical small (or large) **FREEFORMS**. If we limit ourselves to standard index gears of not more than 120 teeth the theoretical limit for L/W ratio for ECED designs is 1.0 to 19.081 (a triangle with one gear tooth separation at the smallest angle), however designs with L/W much larger than 2.0 are troublesome because the extreme range of center to tip distance results in stones that are

ECED is a special condition which although very useful for a large class of facet designs, does not cover all possible designs. For example design 13.067 (page 1 of this issue) is not considered an ECED design because there are two groups of facets which require different CED's and therefore a height adjustment is required during the outline cutting process.

If one is using GEMCAD as a drawing procedure any ECED design outline can be generated by picking a center point (e.g. with the q = query function) and setting in a series of facets at the same elevation angle and at the bearing indices corresponding to the girde outline facets. Then when a set of 90 degree facets are added to this set using the identical bearing indices, a true ECED preform is generated. For the preform, the temporary angle that is picked is not critical, just the fact that all outline generating facets are cut at the same angle. If there in any worry that you might have trouble fitting the outline to the rough, a similar procedure can be applied to the actual stone. Just be sure the "temporary angle" is lower than any that will actually appear on the stone itself to preclude removing too much material from the preform.