

'Facet Designer' - Newsletter 09

THE 'NO-GO ZONE'

HOLLOWAY'S 'NO-GO ZONE'

Garry Holloway 'described' what he calls the 'No-Go Zone' = an area of darkness in a diamond.* These stones look good and are bought by most buyers when they examine them loose, with light coming from the sides; the darkness does not appear until they are mounted. With 'DiamCalc' he showed that these areas are illuminated by rays that enter the pavilion from the side, reflect off the far crown main and then off both sides of the pavilion before exiting the table to the viewer, as illustrated in 'Tips 05'.

Later I showed that, with 34.5° crown mains, this happens, in the 2-dimensional case, when pavilion mains are 42.5° or more*. Sergey Sivovolenko of Octonus provided ray path illustrations using DiamCalc, and noted that there were actually two ray paths which caused this effect*.

Here we confirm this and show that there are actually 3 paths! The gem is Tolkowsky's diamond, with the pavilion slopes modified as shown in Fig.1 (black arrows); other data are shown in the inset; it has 75% deep pavilion break facets.

* 'DiamondTalk', threadid=10892, 11335, 2001 Nov 4, 27

'NORMAL' ILLUMINATION

Fig.1 shows the big dark spots within the table limits (red arrow), which were the subject of discussion then; and also some more dark spots outside the table (blue arrow). We chose 3 Reflections because it is sufficient for this study.

SOURCES of the TABLE SPOT

Using the methods described in Newsletter 04, we identified the sources of the spot in Fig.2, 3, 4; it has 5 pieces.

Fig.2 shows that the big piece is by simple 2-D reflection off pavilion mains in planes parallel to the gem axis (note that '0' meridians line up). The ray comes from about 5° below the horizon. The white arrow shows a little wedge missing and so there are 3 types of pieces making up this spot.

Fig.3 shows that these little wedges also come from about 5° below the horizon. Fig.4 shows that the outer strips come from about 10° above the horizon. These are both 3-D reflections from the sources indicated by the colored arrows.

SPOT OUTSIDE the TABLE

Fig.5 shows the sources which cause these spots. They come from about 10° above the horizon by 3-D paths. Only the source and spot indicated by the blue arrows can be matched-up within the limits of this picture.

Note that it was necessary to roll the sphere about its polar axis to find the source. This was done by dragging the equator vertically with the LEFT mouse button (white arrow and 'L'). We have labeled the '0', '315' and '270' meridians on the gem image; it is important to note that rotating the sphere about its polar axis does NOT rotate the gem.

SUMMARY

This shows that this software and 'DiamCalc' are complementary; each does something the other does not.

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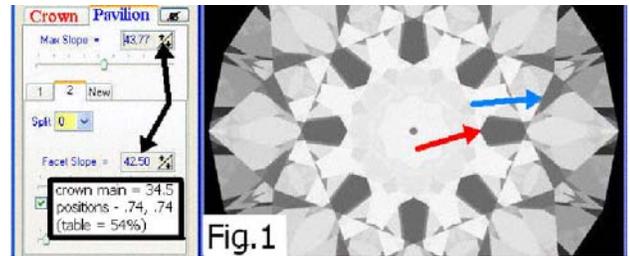


Fig.1



Fig.2



Fig.3



Fig.4



Fig.5