Stabilizing Turquoise and Opal

The numbers at the beginning of each message refer to the Issue number and the message number. Thus, 73-5 is the fifth message in Digest Issue #75. The name in parentheses at the end is the actual file name of this thread file in the Archives.

I've noticed the term "stabilized" used with respect to turquoise and certain opals, and I assume this is a process of curing flaws in a stone so as to be able to shape and polish it without getting a lot of cracks and pits.

...What are the commonly used stabilization processes?
...Which techniques are used with turquoise?
...Which techniques are used with opal?
...How can one recognize a treated piece?

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The term stabilized is most often used when referring to the process of hardening Turquoise and like materials which are too crumbly or soft to cut and polish. The process is done in an autoclave where resins are injected under heat and pressure.

A similar process is used with the dust of these types of materials to press it into a cuttable block. The best test is to touch the material with a hot pin. You can smell the plastic on a treated piece.

More interesting to the small lapidary is the process that I will call fracture filler. This is actually an integral part of the lapidary process when working with Emerald or certain Opals.

First I will mention the commercial product called "Opticon" Which is a two step filler which seems to be like an epoxy and water Glass mix. This is a often used filler manufactured by Huges Associates, Excelcior, Minn that you will find in all Lapidary supplies.
Now Epoxy you will find very useful as fillers of small pits or cracks, and most effective to use as a backing to stabilize a fragile piece through the sawing and grinding process. Best for this is that gray plumbers epoxy applied across the back of the slab.

Water glass is a good penetrant and sealer. This is very good to hide internal flaws. It is just as effective as oil to show color and hide the flaws, except more stable as it actually sets up like a glue.

Lastly I want to mention Canadian Balsam, which you will find very useful as a fracture filler. Pure Balsam is a little complicated in the application, as one needs a vacuum/pressure & heating unit to apply. This can be homemade with parts under $100 (excluding compressor). I am testing now a variation of just Balsam sold to apply slide covers called "Paramount". This is Balsam thinned with Toulene, and with chemical additives to stop the yellowing that can occur with time and the growth that can appear also with time as Balsam is an organic substance.

There is a lot more of these types of "mother nature" fixers. But these above are the easiest to obtain, are non-toxic and quite effective.

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Greetings Friends:
Most common method I'm aware of is using a 311 (two part) epoxy and acetone mixture.

Epoxy type: 330. Two parts, one hardener, one resin. Water Clear Epoxy.
Acetone: One Pint.

Mix both tubes into Acetone, real well. Allow stones to steep for 7-10 days. Swirl brew around about every other day (don't know why, but that's what it says!). Remove and let set for a minimum of one week prior to cutting. Keep jar sealed and it will last quite a long time. KEEP IT SEALED! And in an area that's cooler than my back yard during the month of July. Places NOT to keep it; near the water heater or other sources of heat that could emit
either sparks or open flames (acetone is very combustable), where the children can
find it, if you're still blessed to have them in the house. "Daddy! Look at these
beautiful blue rocks I found in this jar!", goo dripping from their fingers, on the wife's
carpet, trailed through the kitchen. Trust me, no one's going to be happy at this point!
Remove stones from soup. (Kitty litter scooper works good as long as the mouth of
the jar is wide enough, and it's not currently being used for it's designed task.) Place
extracted stones on a surface that no one's going to mind if it gets a little crudded up
(wife's china, DON'T DO IT!). Let dry another week, have fun!

Why stabilize? Seen many an awesome turquoise gem that was full of cracks, pits and
the like. As long as it will polish, and it's turquoise, it's a gem. Problem is, most
material on the market is to soft to cut, thereby won't take a polish. The Stabilizers
harden the material enough to allow the Zam to do it's job. One of the beauties of
turquoise, no one cares if it's calibrated, or if there's rough spots in the stone, or if one
can't comb their hair in the reflection of the polish.

How does one tell if it's been stabilized? Rough form: Plastic like substance
surrounding the stone, easy. Cut form: Not so easy. A raw turquoise nugget will tug at
your lip when you kiss it. This property is deminished when stabilized. Most cutters
don't polish the backside of the stone, freak 'em out, give the stone a kiss on the back
side. If you feel an appreciable tug, probably not been stabilized. Light pull means
more than likely stabilized. Should this happen to you, look them in the eye and say
"stabilized". Walk away. Watch them from a distance. See if they don't do the same
thing! I love gem shows! It can be so entertaining! Polished areas don't give the same
effect, so if the stone is also polished on the back side, your guess is better than mine.
Off topic slightly. Chrysocolla will do the same thing, except it will try to rip your lips
off your face.
Difference between the two stones? Duct and scotch tape.

Sorry for getting long winded, Hope this helps some.

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I'm not familiar with stabilized opal, but the process for turquoise is designed to
remedy its tendency to be porous and change color over time. It usually involves
impregnation with polyester resin, with or without vacuum
assist. Often a dye is introduced as well- this can sometimes be recognized by its
overly blue color. One can generally smell the polyester when cutting the stone; I'm
I'm not sure how to non-destructively test for stabilization in a stone that's been set. I've heard that the very finest grades of turquoise don't need stabilization, but most of the material I've worked with (even the expensive stuff) seems to have been treated this way.

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I asked a commercial processor in Tucson how he did his stabilizing and was told that he used the same polycarbonate that is used in airplane windows. He would not go into details but I would assume this would be done at an elevated temperature and pressure. There are certainly several ways to do it and the results vary widely, I have some you can carve with a knife and some that will scratch glass.

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Bottom line, if the Turquoise is set, you will be hard pressed to tell the difference in good material without testing. Again, buy from someone you trust.

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A little different story here (from turquoise). Both turquoise and chrysocolla come in a range of hardness from chalk to 6.5-7. But chrysocolla is copper silicate, with the hardness varying with the silica content. As the hardness approaches 7 the absorption approaches zero (it becomes chalcedony, and the price becomes impossible :-( ).

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15-4
I do not know about Louisiana opal, but mentioning sugar solutions and a crock pot reminds me of the treatment of Andamooka (Australia) opals.

A book is available which describes the treatment of these opals. Its title is ALL ABOUT ANDAMOOKA OPALS, written by Emory Ligget, and available for $5.00 from him at 1851 West Ehringhaus #121, Elizabeth City, NC 27909, (919)264-4367. Many of you may have met Emory at shows, selling opals.

Also, from The Lapidary Journal Index, I find the following possibly related references:

..Louisiana Opals, Moore, Gary: "Elusive in Louisiana"
86:06:54
..Stability of Opals, "Opal" 86:10:16
.."Opal Treatments" 89:06:44
.."Treating Opal Matrix" 76:10:1787

Reprints are available from Lapidary Journal (1-800-676-GEMS) for a nominal charge. Instructions for ordering reprints from LJ are given in the Archives' file: LJReprints.txt

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