

# Re: Recasting a broken small nylon gear

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*Source:* <http://sci.tech--archive.net/Archive/sci.electronics.repair/2009-03/msg00424.html>

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- *From:* Jim Yanik <[jyanik@xxxxxxxx](mailto:jyanik@xxxxxxxx)>
  - *Date:* 16 Mar 2009 21:43:38 GMT
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msg <[msg@xxxxxxxxxxxxxxxxxxxx](mailto:msg@xxxxxxxxxxxxxxxxxxxx)> wrote in  
news: -OdnWwSE53cBSPUnZ2dnUVZ\_ryWnZ2d@xxxxxxxxxxxxxxxxxxxx:

I needed to repair an Exabyte 8505 8mm tape drive which had a broken 14 tooth approx 3/8 inch diameter nylon gear in the cartridge handling mechanism, and lacking suitable spares, I decided to attempt to reform the gear; this post describes the method and results.

A suggestion was made in a previous Usenet post to assemble the fragments of a broken nylon gear and immerse them in a pot of epoxy heated to a thin consistency, allow it to set, and then heat the works until the nylon reformed. No mention was made of actual results or how the gear would be removed from the epoxy mold:

<http://groups.google.com/group/sci.electronics.design/msg/93ebc61f0893eb4f?dmode=source>

I wired together the two pieces of the broken gear with a bit of small gauge nickel wire around the arbor portion of the gear, mixed up "steel" JB-Weld into a small metal bottle cap just a bit larger than the gear diameter, heated the epoxy with a heat gun until thinned and immersed the gear to the level of the top of the arbor section. The assembly was allowed to cure overnight. The following day I heated the assembly from beneath using a heat gun set to a low setting while observing the bit of nylon visible from the top of the pot. After a few minutes, the nylon began to expand and extrude from the assembly. I stopped heating and using a flat tool, pushed the nylon back down flush with the rest of the epoxy mold. I repeated this heating and pressing procedure another time and then allowed the assembly to cool.

Using a small drill bit in a Dremel tool, I milled a groove around the perimeter of the epoxy mold and popped-out the slug containing the gear. Sanding the underside smooth revealed the pattern of gear with the teeth clearly visible, but also revealed that the epoxy had disappeared from the center hole of the gear. Grinding the epoxy mold material away from a gear tooth using an emery wheel in the Dremel tool also revealed that the epoxy had fused with the nylon and was inseparable. I wound up "carving" the gear out of the mold with the

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emery wheel.

The center hole was restored by milling it out with a number 60 drill bit in the Dremel tool, working from both sides to preserve centering (under magnification parallax can become distorted) and to cut a D shaped hole to accommodate the drive shaft.

The key points to be made are that using this process will produce a solid gear but it will be fused with the epoxy mold material and cannot be simply separated from it.

The results are pictured in this photograph which shows the gear installed in the tape drive mechanism:

<http://www.cybertheque.org:81/ext/gear/gear1.jpg>

It works as intended but long-term reliability is as yet unknown.

I did not apply any grease to (or even degrease) the original gear parts before immersing them in the epoxy; I don't expect that using grease or mold release would have altered the results or permitted removal from the mold. Perhaps a multistage casting process starting with a latex mold, followed by a casting of a slug of the gear which then could be used to cast a mold from a pot metal which then could be used for casting fresh gears is another solution, especially if quantities of the part were useful to have (since this failure mode is common in this tape drive, it may make sense), but for me, reforming the original gear was adequate.

Michael

go to a hobby/crafts store, and you can buy rubber casting material.

BTW, PAM no-stick spray works for a release agent.

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