Grinding it Out

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My wife, Wendy, and I have been taking on a lot of DIY home improvement projects lately around the house. Our weekends have been busy with things like patching drywall, installing trim, refinishing floors, painting walls and the like. Aside from the amazing support of my partner (which goes without saying, of course), one of the things I've come to appreciate most during these past few weeks is the importance of surface finish. We've spent a lot of time scraping, sanding and smoothing in order for our projects to turn out the best they can.

In the case of our home, the surface finish is all about appearances. You can't just paint over imperfections if you want it to look right. No, you have to patch all the holes and repair all the damage that results from 20 years of living in the same place. Then, when everything is smooth and clean – with no dents or dings – it looks brand new.

But surface finish isn't just important when you're doing home repairs. It's important for gears, too. Only with gears, that surface finish isn't about appearance. It's about creating precision, quiet gears.

Today, that's more important than ever. With the automotive industry shifting towards more and more electrically-driven concepts – from full plug-in electric vehicles to hybrids driven by a combination of internal combustion and electric motors – there is also a shift in the requirements for gears.

Electric motors used in these applications run at much higher speeds than internal combustion engines. They also run much quieter. So, the transmissions that transfer power to the wheels need to accommodate those speeds without generating too much noise. Once you remove the internal combustion engine, the transmission is often the next noisiest thing in the car.

So quiet gear drives are extremely important these days, and the automotive industry is just one example. There are many other applications where gear noise has become equally important – everything from drones to wind turbines.

Quieter gears require a better surface finish, which means they need to be manufactured with additional processes like grinding and honing. That's why we've chosen surface finishing as the focus of this issue.

In Senior Editor Matthew Jaster's article on gear grinding (p. 22), he explores the ways many of the leading suppliers in the industry are improving technology to help gear manufacturers produce higher quality gears more productively.

Dr. Antoine Türich of Gleason explains how the latest gear honing processes can be extremely useful in producing gear components specific to automotive eDrives (p. 26). Gleason also contributes a second article on automotive eDrive gear noise with Dr. Hermann J. Stadtfeld's "Psychoacoustics Applied to eDrive Noise Reduction" (p. 48).

But the story doesn't end here. You should also go to *geartechnology.com* for even more great articles related to surface finishing. In fact, if you check out our *GT Extras* column (p. 6), you'll see that we've lined up some great online exclusive articles and videos from the likes of ANCA, Felsomat and Liebherr.

Also, if you're interested in learning more about how the auto industry's shift to eDrives will affect the gear industry, I highly recommend you read the AGMA's new white paper, "A Gearing-Centric Snapshot of the EV Space." The in-depth white paper, written by AGMA's Electric Drive Committee, takes a detailed look at the gearing developments in drivetrain design, the high-level technology in the machine tool market, new players in the industry, different manufacturing processes and the quest for the silent drivetrain. The paper is the result of more than six months of thoughtful collaboration and research by the committee, and it's well worth the read. It's available to both AGMA members and non-members in the store at *www.agma.org*.

We hope you enjoy our issue on surface finishing. I have to get going, because it's already late on a Friday afternoon, and I have some surface finishing projects of my own to get to.