Episode Book

EPISODE #5579

Cutting Things With a Dremel: What Actually Works

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SYNOPSIS

A listener's engraving tool turned out to be forty tools in one, and now he wants to know which cutting attachments are worth owning. This episode sorts the Dremel cutting ecosystem into its two real families — thin abrasive wheels and solid carbide cutting bits — and explains why the distinction determines what you can safely do. We cover fiberglass-reinforced wheels, CBN-coated discs, the 561 multipurpose bit, the 565 cutting guide, and the mini angle grinder attachments that turn out not to be official Dremel products at all. Then we get into numbers: RPM ranges for hardwood versus softwood, depth ratings for plywood and MDF, and the metal thickness limits for aluminum and mild steel. Along the way there's a reconciliation of two pieces of advice that sound contradictory — side-loading a cut-off wheel is the leading cause of shattering, but clearing material laterally with a cutting bit is exactly what it's built for. The rule is about the tool, not the motion.

TRANSCRIPT



Corn

The rotary tool gets called the most versatile power tool you can own, and that claim gets thrown around so casually that nobody ever asks what it costs you. Because versatility isn't free. Every job it can do, it does a little worse than the tool that exists specifically for that job.



Herman

And the interesting question is where that trade-off actually bites, because for some jobs it doesn't bite at all.



Corn

Right. So Daniel wrote in with a whole thing about this. He bought his Dremel for engraving, originally. He was tired of adhesive stickers peeling off his inventory bins, and you can't reliably mark small electronic parts any other way, so engraving was the whole reason he bought it.



Herman

And then he discovered that engraving is one capability out of about forty.



Corn

He's been doing small cuts in MDF. He moved some networking gear up higher as part of Hannah's bookshelf project so Ezra couldn't reach it, and that meant cutting a rectangle out of an MDF backing for cable routing and power ports. He used a sharp carbide and lateral movement, and he says at high enough RPM it cut across and down like butter. Not the most elegant solution, in his words.



Herman

But it worked.



Corn

It worked. Then today he's looking at a cutout in a networking cabinet, sees sparks flying, realizes he doesn't have the right protection for the job, and trades the whole approach for a stepped drill bit rather than burn the couch.



Herman

Sensible.



Corn

And the actual questions he wants us on are these. What are the useful cutting attachments, how do you match attachment and carbide to wood, MDF, plastics, and sheet metal, what techniques and RPM settings actually work, and why are rotary tool cutting attachments better advised than the drill-to-jigsaw adapters we talked about a while back. He's noticed there are attachments that turn the thing into a mini angle grinder and mini saws, and he wants to know which of the many options makes sense for which material.



Herman

There's a lot in there. And the framing he's using is right, which is that the rotary tool is versatile but every single source draws the same line in the same place.



Corn

So where do we start?



Herman

Start with why it's versatile at all, because it's one mechanical fact and everything else follows from it. The collet. It's an eighth of an inch, three point two millimeters, and it's the universal interface. Any accessory with that shank gets driven at whatever the motor's turning, which on a variable speed Dremel is five thousand to thirty-five thousand RPM.



Corn

One motor, infinite shanks.



Herman

That's the whole trick. Dremel's own catalogue splits cutting into two families. Cut-off wheels, which are thin abrasive discs for slicing, grooving, and trimming. And cutting bits, which are spiral or multipurpose bits you use with a cutting guide, and they cut in any direction like a spiral saw blade.



Corn

So the episode is the cutting subset. Not sanding, not engraving, not polishing. Removing material.



Herman

And the tension we're going to keep coming back to is that the tool is versatile but the sources all agree on where it stops. Past about five eighths of an inch in wood, or three eighths in metal, a dedicated tool wins. The rotary tool's value is access and small incisions, not throughput.



Corn

Access and small incisions. That's a good frame for the whole thing.



Herman

So the arc is attachments, then material matching, then technique and RPM, then the mechanical reason rotary cutting works where drill-jigsaw adapters fail, and then safety, since Daniel brought us sparks.



Corn

Let's do attachments first, because the taxonomy is where people get lost. There's a lot of shiny things in the Dremel aisle and no obvious logic to any of it.



Herman

There is logic to it, it's just buried. Cut-off wheels first, since that's what most people picture. The fiberglass-reinforced ones, the EZ456 and the EZ409, plus the older 426 and 409. These are thin abrasive discs. Dremel says the EZ456 is ideal for slicing, cutting, grooving, and trimming hard metals like steel, metal pipes, or sheet metal, and they claim it does twice as many cuts as the 426.



Corn

Twice as many cuts. That's a marketing number and we'll come back to it.



Herman

We will. The EZ409 is the thin-kerf version, so it removes less material and cuts faster but it's more fragile. And then there's the Max EZ506HP, which is the interesting one. It's coated with cubic boron nitride, CBN, which is an abrasive grit that lets the wheel stay in shape and stay cool without shrinking.



Corn

CBN. That's the same family of stuff they use on grinding wheels for hardened tool steel.



Herman

Same idea. It's a superabrasive. It doesn't dull the way aluminum oxide does, so the wheel keeps its geometry instead of turning into a lopsided disc.



Corn

Which matters, because a lopsided disc at thirty thousand RPM is a vibration problem.



Herman

It's a vibration problem and a shattering problem. So that's the wheel family. Then cutting bits, which is the family Daniel's actually been using. The multipurpose cutting bit, the 561, is rated for wood, plastics, drywall, fiberglass, vinyl and aluminum siding, acoustical tile, and laminates.



Corn

That's a strange list. Siding and acoustical tile in the same sentence.



Herman

It's a bit that's designed to be mediocre at a lot of things, and it's honestly good at the soft stuff. There's a drywall cutting bit, the 560, and Dremel's manual has a specific instruction for it, which is to insert it as far as possible and cut counter-clockwise when you're using an outlet-box template.



Corn

Counter-clockwise. That's oddly specific.



Herman

It's because the bit's rotation means it wants to walk one direction, and going counter-clockwise around the box keeps it against the template instead of climbing out of it. Then there are spiral cutting bits, which are for detail work and curved cutting, and they'll do everything from wood to fiberglass. They're thin enough to find their way into small spaces.



Corn

That's the one that's closest to what Daniel was doing with the carbide and the lateral movement.



Herman

Close, yes. And then the Multipurpose Cutting Kit, the 565. This is the one I'd actually point him at for the networking cabinet. It's a screw-on router-style guide, adjustable depth up to three quarters of an inch, nineteen millimeters, with big windows so you can see what you're doing. Dremel's own description is that it makes freehand, controlled cuts of any shape in laminate, drywall, wood, fiberglass and more. It's about twenty-six dollars.



Corn

So that's the closest thing in the ecosystem to a guided cutout tool.



Herman

It's the closest thing to a plunge router that fits in your hand. There's also a wood cutting wheel, the SC544, for straight thin cuts in wood, rated to half-inch plywood. And there's a Line and Circle Cutter attachment that does perfect holes and straight lines.



Corn

Okay, now the question Daniel actually asked, which is the mini angle grinder thing. He saw attachments that turn it into a mini angle grinder.



Herman

And here's where I have to be honest about a negative finding, because I looked and I couldn't confirm a first-party Dremel shank attachment that converts a rotary tool into an angle grinder. What exists is standalone mini angle grinders. There's a FLEX three-inch mini grinder that runs at twenty thousand RPM, there's the Arbortech mini grinder, there's the Merlin2. And there are third-party small cutting discs sold for mini angle grinders or for industrial Dremels.



Corn

So the thing he saw was probably either a third-party disc or a different tool entirely.



Herman

Most likely. Dremel's own ecosystem leans on abrasive wheels rather than toothed mini-saw blades for metal. So treat the mini angle grinder attachment as a third-party or DIY category, not an official product. Which is worth saying plainly because if you go looking for the official Dremel one you'll be looking a long time.



Corn

And the mini saw attachment he mentioned picking up?



Herman

I couldn't identify that by name either. Dremel's catalogue doesn't list a toothed mini-saw shank attachment for metal. Their metal cutting is abrasive-wheel-based, full stop.



Corn

Which brings us to the thing I think is the most useful single takeaway in this whole episode, and it's a distinction nobody makes clearly. Daniel cleared an MDF rectangle with lateral movement and a sharp carbide. And every source we looked at warns that side-loading a thin cut-off wheel is the number one cause of shattering.



Herman

Both of those are true and they don't contradict each other.



Corn

Explain it, because on its face it sounds like Daniel did the dangerous thing and got away with it.



Herman

He didn't do the dangerous thing, because he wasn't using a thin abrasive wheel. Lateral clearing is fine with a cutting bit. The 561, or a 191 high-speed cutter. Those are solid carbide tools with a cutting edge, and they're designed to be moved sideways through material. What's dangerous is side-loading a thin abrasive disc, because the disc is brittle and has almost no resistance to bending. It's a grinding wheel the thickness of a coin.



Corn

So the rule is about the tool, not the motion.



Herman

The motion is only dangerous in combination with the wrong tool. A cutting bit moved laterally is doing what it's designed to do. A cut-off wheel moved laterally is being asked to be a milling cutter, and it will fail.



Corn

That's the reconciliation. Lateral is fine with a bit, fatal with a wheel.



Herman

And that's why Daniel's instinct that the options are better advised than drill-jigsaw adapters is correct, but it's correct for a reason he might not have articulated. The rotary tool gives you two different cutting mechanisms in one body. Abrasion, which is the wheels. And edge cutting, which is the bits. A drill-jigsaw adapter only ever gives you one, badly.



Corn

So let's go to material matching, because that's where the numbers get real and where people get themselves into trouble.



Herman

Wood and MDF first, since that's what Daniel's been cutting. The wood cutting wheel, the SC544, is rated to half-inch plywood. The multipurpose bit, the 561, is rated to five eighths of an inch.



Corn

And a two by four is an inch and a half.



Herman

An inch and a half. So a standard two by four is roughly two point four times beyond what even the 561 is rated for.



Corn

People cut two by fours with Dremels all the time, though.



Herman

They do, and it takes forever and it's not what the tool is for. You can do it. You'll be there a while and you'll go through bits. The rating isn't a wall, it's a statement of what the tool is efficient at.



Corn

What about hardwood versus softwood?



Herman

Hardwoods like oak and maple want carbide-tipped bits. Softwoods cut cleanly with standard high-speed steel. And the RPM guidance matters more than people expect. Twenty to thirty-five thousand for hardwood and standard cuts. Drop to fifteen to twenty thousand for softwoods and detail work.



Corn

Why drop for softwood? That seems backwards. Softer material, less resistance.



Herman

Because softwood burns. Full thirty-five thousand RPM on soft pine scorches the cut edge brown within seconds. You're not cutting at that point, you're friction-burning a groove. Slower speed, faster feed, cleaner edge.



Corn

That's counterintuitive and it's the kind of thing you only learn by ruining a piece of pine.



Herman

Everybody ruins a piece of pine. It's a rite of passage.



Corn

Metal next.



Herman

The EZ456 fiberglass-reinforced wheel is the workhorse. Aluminum, brass, copper up to about three sixteenths of an inch. Mild steel, sheet steel, galvanized pipe, about an eighth to three sixteenths. Stainless, about an eighth, and slower.



Corn

And hardened steel?



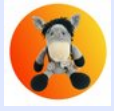
Herman

Not recommended. Files, tempered bolts, that category. Use an angle grinder instead. And past about three eighths of an inch thickness, an angle grinder or a chop saw handles it more efficiently than a Dremel ever will.



Corn

So the metal ceiling is three eighths, and the wood ceiling is five eighths, and past those you're just stubborn.



Herman

You're just stubborn, and there's no shame in that, but you should know you're being stubborn.



Corn

What about RPM on metal?



Herman

Run near the top setting, up to thirty-five thousand, for aluminum, brass, copper, and steel. Drop the speed slightly on stainless to reduce heat buildup, because stainless work-hardens and heat makes it worse. And Dremel rates its cutting wheels to a maximum of thirty-five thousand RPM, so you're running them at their design point.



Corn

Plastics?



Herman

The 561 multipurpose bit and the spiral bits cover plastic. There's also an EZ728-01 micro kit that's pitched for cutting both metal and plastic.



Corn

Which is the thing about plastics, is they're the material where the rotary tool is the right answer and not a compromise. Because plastic is soft enough that the low torque doesn't matter and the speed gives you a clean edge.



Herman

That's right. Plastic is where the rotary tool stops being a compromise and starts being the correct tool. Sheet metal is where it's a compromise that happens to work.



Corn

Now technique, because this is where Daniel's actual question lives. He wants to know about lateral movement and RPM for making incisions and cutouts.



Herman

The core technique for metal is to guide the wheel straight down through the material in light, steady passes. Never twist or lever the wheel sideways. That's what shatters it. And clamp the workpiece.



Corn

Clamp it because?



Herman

Because a moving workpiece is the most common cause of a snapped wheel. If the material shifts while the wheel's in the kerf, the wheel takes a bending load and it's done. Dremel recommends a two-handed grip and letting the tool do the work.



Corn

And no cutting oil.



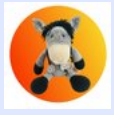
Herman

No cutting oil. Abrasive wheels aren't toothed blades. There's no chip to clear and no edge to lubricate. If the wheel starts smoking, you ease off the pressure. That's the whole diagnostic.



Corn

Now the mechanical reason, which I think is the intellectual core of this episode and the thing Daniel was reaching for when he said the options are better advised.



Herman

The cutting accessory is coaxial with the motor. It's on the same axis as the spindle, spinning at high RPM. So it cuts by abrasion, or by a spiral bit's edge in any direction, with no reciprocating linkage and no offset mechanism to introduce wobble.



Corn

Whereas a drill-to-jigsaw adapter has to convert rotation into reciprocation through some kind of offset crank, and that linkage is where the whole thing falls apart.



Herman

It's where the wobble lives. You've got a mechanism that's converting one motion into another, and every conversion introduces play. And Dremel explicitly markets cutting bits that cut in a manner similar to spiral saw blades in any direction. That's the capability a drill-jigsaw adapter tries and fails to fake.



Corn

So Daniel's intuition is right and now we know why. The rotary tool doesn't have to convert anything. It's already spinning, and the accessory is on the same axis.



Herman

The motion never changes. Only the accessory does.



Corn

Which is also why the versatility is real and not marketing. It's the same reason.



Herman

It's exactly the same reason. The versatility and the cutting ability are the same mechanical fact.



Corn

Now, marketing versus field reports, because Daniel's going to go buy something and he should know what he's buying.



Herman

Dremel claims EZ Lock changes accessories six times faster than a standard mandrel, and the EZ456 claims twice as many cuts as the 426. Those are real conveniences. But there are users on Garage Journal reporting that EZ Lock discs tend to get off-center and vibrate if you get a little side load on the disc.



Corn

Which is the same failure mode we've been talking about.



Herman

It's the same failure pattern, and it's worth knowing that the quick-change mechanism is a place where runout can creep in. There's also a YouTube reviewer on the 565 guide who notes that for thin plywood it works fine, but it's hard to get a clean cut with a rotary tool. It makes an insanely high-pitched sound and wears out the bit.



Corn

So the guide gives you control but not necessarily a furniture-grade edge.



Herman

It gives you a controlled cutout, not a finished edge. You'll still want to clean it up.



Corn

And then safety, which is where Daniel's sparks come in and which is the part of this I actually care most about, because he was about to burn a couch.



Herman

Dremel's guidance is gloves, preferably leather, goggles, and a dust mask. Their line is that you don't want to be breathing in tiny glass or metal shards or getting them anywhere near your eyes.



Corn

Which is a sentence that covers a lot of ground.



Herman

Metal cutting specifically, always wear safety goggles or a face shield. Metal shavings and sparks can cause serious eye injuries in a fraction of a second. Long sleeves, thick pants, closed-toe shoes, leather gloves. And work with an open window or an exhaust fan, because metal cutting produces fumes that build up fast in a closed garage.



Corn

Daniel's decision to trade the angle-grinder-style cut for a stepped drill bit after the sparks started is the right call, and it's the right call for the reason the sources give. Not because sparks are inherently terrifying, but because sparks mean you're throwing hot metal at whatever's in front of you, and he wasn't set up for that.



Herman

He wasn't wearing a face shield. He said so.



Corn

And the stepped drill bit is the right answer for a networking cabinet anyway, because you're making a round hole for a connector, and a stepped bit makes a round hole with a clean edge and no sparks and no kerf to clean up.



Herman

The right tool for the job, which is the theme of the whole episode.



Corn

The right tool for the job, and the rotary tool's job is the jobs where the right tool doesn't fit.



Herman

Which is a real job. It's not a consolation prize.



Corn

No, it isn't. Access is a real capability.



Herman

One small correction on that number from a moment ago. The EZ456 is rated for metal up to three sixteenths, but the practical limit people report for regular use is closer to an eighth, because the wheel wears and the cut gets slower as the diameter shrinks. The rating is for a fresh wheel.



Corn

Good. Noted.



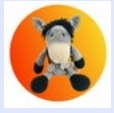
Herman

The other thing worth knowing is that the wheel diameter matters more than people think. As it wears down, the surface speed at the edge drops, even at the same RPM. So a worn wheel cuts slower and generates more heat for the same feed pressure. That's why people think their Dremel got weaker. It didn't. The wheel got smaller.



Corn

Which is why you change the wheel before you think you need to.



Herman

Change it when it stops cutting, not when it stops existing.



Corn

So the picture is, the rotary tool is two cutting tools in one body. Abrasive wheels for slicing, cutting bits for clearing. And the whole game is knowing which one you're holding.



Herman

And knowing that lateral movement is a property of the bit, not of the tool.



Corn

Which means the answer to Daniel's question about which attachment makes sense for which material is actually a two-by-two. Soft material or hard material, and slicing or clearing.



Herman

Slicing soft, that's the wood wheel or a spiral bit. Clearing soft, that's the 561 or a 191 carbide. Slicing hard, that's the EZ456 or the CBN wheel. Clearing hard, that's a different conversation, because you're probably using the wrong tool.



Corn

And the guide, the 565, is for when you need the cutout to actually be a rectangle and not a suggestion of one.



Herman

That's the honest use case for it. It turns a freehand cut into a controlled one. It doesn't turn it into a router.



Corn

Which is the trade-off in one sentence. Versatility, not finish quality.



Hilbert

The rating on the 561 is for a fresh bit in clean stock. In medium-density fiberboard with a paper backing, you get about half that before the edge goes.



Corn

Half.



Hilbert

Half. The paper backing is abrasive. It's not the wood that dulls the bit, it's the glue and the paper. I spent a summer in a sign shop cutting letters out of acrylic and aluminum composite with a Foredom on a flex shaft. The owner had a wall of bits, labeled by material and by job, and he would check which one you took.



Corn

He checked.



Hilbert

I was cutting a logo out of quarter-inch aluminum composite and I grabbed what I thought was the right spiral bit. It was a wood bit. It grabbed, it kicked, and it gouged the panel about three inches in.



Corn

What did he do?



Hilbert

He didn't fire me. He made me re-cut the whole thing by hand with a jeweler's saw. Took most of a day. I still have the gouged panel in a box in the garage.



Corn

What are you going to do with it?



Hilbert

I keep meaning to cut it down into a small shelf. I haven't gotten around to it. I'm still a little mad at it.



Corn

That's fair.



Hilbert

The thing he used to say was that the most dangerous tool in the shop wasn't the tool. It was the person who thought they knew which bit to grab without checking. And there's a distinction there that your research didn't quite get to. A dull bit of the correct type will still cut. Slowly, and it'll get hot, but it'll cut. A sharp bit of the wrong type will grab and ruin your workpiece. Sharp is not the same as right. The other thing is the aluminum composite. That stuff is two thin skins of aluminum over a polyethylene core. A wood bit will grab the skin and then the core has nothing to cut, so the bit dives. That's the kick. It's not the bit being dull. It's the bit being wrong for a sandwich.



Corn

So the failure isn't gradual.



Hilbert

It's instant. That's the whole problem with the wrong bit. There's no warning.



Corn

So the rotary tool is versatile, but versatility means you have to know which attachment to grab. And that knowledge comes from experience.



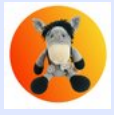
Herman

Sometimes painful experience.



Corn

Sometimes a day with a jeweler's saw.



Herman

That's the thing I keep coming back to about this whole topic. The tool is capable of all of it. The capability isn't the hard part. The judgment is the hard part.



Corn

Which is why the answer to Daniel's question isn't a list of attachments. It's a list of attachments plus the rule for when to stop.



Herman

The rule being, past five eighths in wood or three eighths in metal, get the other tool.



Corn

That's not a limitation of the Dremel. That's a limitation of any tool that's trying to be forty tools.



Herman

Which is the honest trade. You get access and you give up throughput.



Corn

If you take one thing from this, it's that the rotary tool's cutting ability and its versatility come from the same mechanical fact. The accessory is coaxial with the motor, so the motion never changes, only the accessory does. That's why it works where a drill-jigsaw adapter doesn't.



Herman

The corollary is that because the motion never changes, you have to change the accessory. The tool won't tell you you've got the wrong one. It'll just grab.



Corn

The one thing. Thanks to Hilbert Flumingtop for producing. This has been My Weird Prompts. If you enjoyed this one, leave us a review on your podcast platform of choice. It helps other listeners find the show. We'll be back soon.