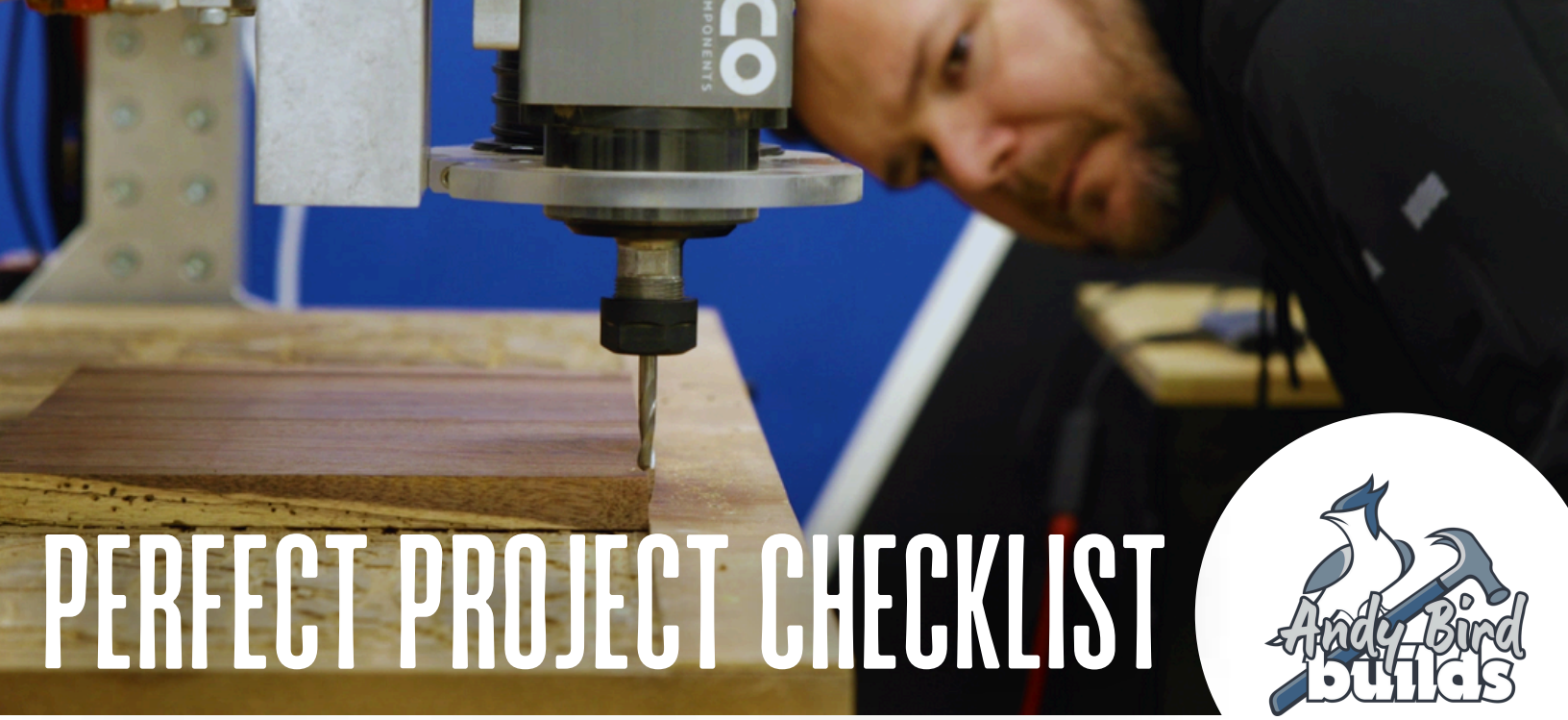


PERFECT PROJECT CHECKLIST

Get Perfect CNC Projects EVERYTIME!

Have you ever ruined a CNC project over one small mistake, like forgetting to reset your Z-zero or choosing the wrong post-processor? I've been there too.

When I first started, I was carving into a beautiful $100 piece of walnut. I thought I had everything set up perfectly. But I missed a simple checkbox and the machine plunged straight into the wood, destroying the walnut and my confidence.

That experience taught me a tough lesson: **a CNC machine will do exactly what you tell it or what you forget to tell it to do.**

That's why I created the Perfect Project Checklist. It's the checklist I wish I had back then, and now use on every project to catch little things that lead to big mistakes.

Whether you're making a quick gift or a high-end order, this checklist helps you save expensive materials, trust your cuts , and get predictable results.

Use the Perfect Project Checklist before you start every CNC job to make sure you haven't missed any critical steps—so you can get perfect results every time!



01 Pre-Export File Check

- [ ] Design size matches your material size (including actual thickness) 1.1
- [ ] All toolpaths are correctly created and assigned to the right bit 1.2
- [ ] Safe start and rapid moves are clear of clamps and hold-downs 1.3
- [ ] Safe Z height clears all hold-downs 1.4
- [ ] All toolpaths have been simulated to confirm cutting direction and depth 1.5
- [ ] Post processor is correctly set for your machine (e.g., “Shapeoko (inch)”) 1.6
- [ ] File is named clearly (e.g., “tray_v2_cutout.nc”) 1.7
- [ ] File is saved/exported to the correct format for your CNC 1.8

02 Material Setup

- [ ] Material size matches what's in the software (length, width, measured thickness) 2.1
- [ ] Material is securely attached using screws, tape, or clamps 2.2
- [ ] Material is oriented correctly (grain direction matches design) 2.3
- [ ] Material has been surfaced if needed (for flatness/detail carving) 2.4
- [ ] No clamps are in the toolpath area 2.5

03 Bit and Tooling

- [ ] Correct bit is installed (double-check diameter and type) 3.1
- [ ] Collet is clean and free of dust or debris 3.2
- [ ] Bit is tight in the collet and collet nut is secure 3.3
- [ ] Bit is inspected for wear or damage 3.4

04 Machine Setup

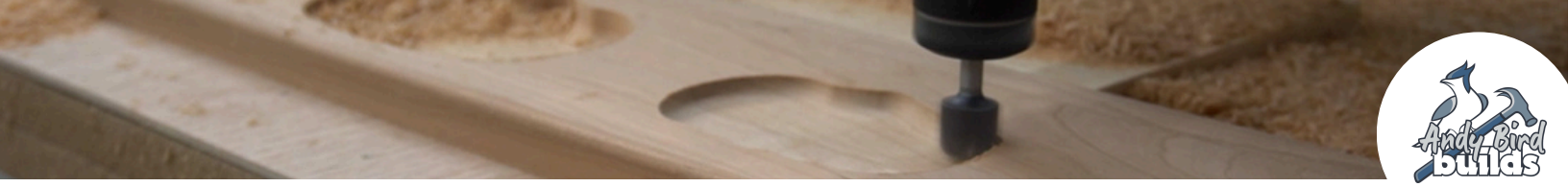
- [ ] X, Y zero is set to the same reference as in the software (usually lower-left) 4.1
- [ ] Z-zero is set to the same reference as in the software (top of material or machine bed) 4.2

05 Air Pass

- [ ] All toolpaths have been run as an air pass 5.1
- [ ] Z-zero has been reset after the air pass 5.2

06 Final Safety Check

- [ ] Safety glasses and hearing protection are on 6.1
- [ ] You know where the emergency stop is 6.2
- [ ] Spoilboard area is clear of tools and debris 6.3
- [ ] Router/spindle is actually turned on 6.4
- [ ] RPM dial is set correctly (if using a manual speed router) 6.5
- [ ] Dust collection is on (or ready to start) 6.6
- [ ] Z-zero has been reset after any bit change 6.7



CHECKLIST DETAILS

Pre-Export File Check

1.1 Cutting outside your stock ruins your project. Always measure your material and make sure your design file matches.

1.2 Using the wrong bit can ruin detail or break your tool. Double-check each toolpath and ensure the correct bit is assigned.

1.3 Clamps in the path of rapid moves cause collisions. Preview your toolpath and verify no travel paths pass over hold-downs.

1.4 Low Z-height causes the bit to hit clamps. Set your safe Z-height above your tallest clamp or screw.

1.5 Missing a cut, incorrect direction, or depth can all ruin your job. Simulate toolpaths to visually confirm all actions.

1.6 Using the wrong post processor can prevent your file from running—or run it incorrectly. Confirm it's set for your machine.

1.7 Vague or reused filenames cause confusion. Use version numbers or descriptive names to avoid running the wrong file.

1.8 Some machines need a specific file extension (like .nc or .txt). Double-check the format required for your CNC controller.

Material Setup

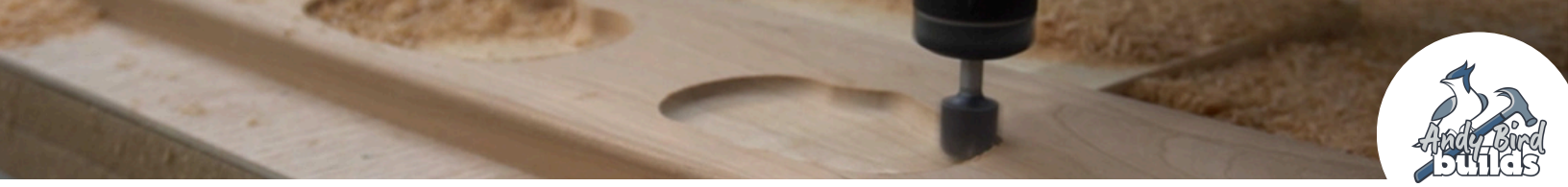
2.1 Material dimensions must match the digital design or your cut will overrun or miss key areas.

2.2 Loose material shifts during cuts, leading to inaccuracy or tool breakage. Use clamps, tape, or screws to keep it from moving.

2.3 Grain direction affects how your project looks. Align your material as planned for best results.

2.4 Uneven surfaces cause inconsistent carving depths. Surface your stock before cutting, especially for detailed designs.

2.5 A clamp or screw in the toolpath is an instant project killer. Triple-check that the entire cut path is clear.



Bit and Tooling

3.1 A mismatched bit can cause burning, rough cuts, or failure. Use the exact size and type from your toolpath.

3.2 A loose bit slips mid-cut, ruining depth and risking safety. Secure it firmly, but don't over tighten.

3.3 Dust in the collet stops it from gripping properly. Clean it out every time with compressed air or a brush.

3.4 Dull or chipped bits make ugly cuts and overheat. Visually inspect before every job.

Machine Setup

4.1 Wrong X/Y zero means the machine starts in the wrong place. Match it to your design (typically lower-left or center).

4.2 If your Z-zero doesn't match the software setting, everything will cut too deep or too shallow. Double-check this!

Air Pass

5.1 An air pass is a dry run with the bit above the material. It catches issues before they ruin wood or bits.

5.2 After the air pass, reset your Z-zero before real cutting. Forgetting this is a top mistake.

Final Safety Check

6.1 Protect your eyes and ears from dust, splinters, and loud machines. Safety gear is essential.

6.2 You must know how to stop the job instantly in case something goes wrong.

6.3 Any object on the bed can become a projectile or ruin your cut. Clear everything not part of the job.

6.4 Starting a job with the router off leads to broken bits. Confirm it's powered and spinning.

6.5 Manual routers need the correct RPM—too high burns, too low stalls. Adjust before cutting.

6.6 Dust collection helps you see your work and stay safe. Turn it on first.

6.7 Bit changes alter the length—always re-zero your Z to avoid cutting too deep or missing the cut entirely.



About Me



Hi, I'm Andy Bird, a CNC expert who started with zero CNC experience. I know firsthand how overwhelming CNC can feel, because I learned the hard way—through trial and error.

My favorite part of CNC is taking an idea and bringing it to life. I still remember my first project—a simple cutout of Michigan that I proudly gave to my mom. That feeling of creating something from scratch is one of the coolest things in the world.

Since 2017, I've helped over 100,000 CNC hobbyists transform frustration into confidence. I've even created CNC products for clients like HGTV and Saturday Night Live.

My approach is practical and common-sense driven. For example, one of my biggest pet peeves is seeing beginners spend a fortune on fancy CNC bits before they even know how to use them.

At Andy Bird Builds, you'll find step-by-step CNC training courses that cover everything from your first V-carve sign to advanced 3D relief CNC projects. I'll help you choose the right machine, learn feeds and speeds, and master finishing techniques so you can build projects you're proud to share—or even sell.

Learn. Build. Profit with CNC.



Taking It to the Next Level

If you want to create awesome CNC projects like a pro, you'll need more than a basic checklist. That's why I created a brand-new online course called The CNC Kickstart, a step-by-step course that teaches you the different CNC disciplines in a smooth, repeatable workflow.

THE CNC KICKSTART

Inside, you'll learn how to tackle projects from simple designs to stunning 3D reliefs, choose the right bits, understand feeds and speeds, master workholding, and even sand and finish your projects—so they're something you'd be proud to share with friends, family, or even sell.

Click below to join the waitlist and be the first to know when enrollment opens!

JOIN THE WAITLIST

- Andy