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WIDE BELT SANDER TROUBLESHOOTING GUIDE

INTRODUCTION

While the act of sanding in itself may be a very simple concept, wide belt sanding and wide belt sanders can be anything but. At some point, you're bound to run into issues with your sander. You may notice visual defects in your work pieces or there may be problems inside the machine that manifest in the form of belt issues. Trying to diagnose and isolate the root causes for wide belt sander issues can be extremely difficult.

Here is a compiled a list of the most common wide belt sander issues and their respective potential fixes. Symptoms for issues with wide belt sanders can effectively be broken down into two categories: Machine & Abrasive Problems, or Workpiece Visual Defects. Both categories are covered in full below.

1 MACHINE & ABRASIVE MAINTENANCE ISSUES

- 1.1 IMPROPPER BELT TRACKING
- 1.2 BELT BURNING OR OVERLOADING
- 1.3 EXCESIVE DUST OR STATIC ELECTRICITY BUILDUP
- 1.4 A BROKEN OR DAMAGED BELT

2 WIDE BELT VISUAL SANDING DEFECTS

- 2.1 CHATTER MARKS
- 2.2 RIDGES
- 2.3 SCRATCHES OR GROOVED LINES
- 2.4 WAVY SURFACES

1.1 IMPROPER BELT TRACKING

When a belt isn't tracking properly on the machine it will slide off of the rollers or mis-align while running. Improper belt tracking can result in a premature wearing of the belt and belt breakage. Improper belt tracking could be caused by issues related to the laser eye, tension pressure, belt cut, removal rate, improper abrasive storage, or uneven rollers.

Blocked Laser Eye

When the laser eye is blocked there can be issues with belt tracking. Clean the laser eye to ensure that it is free of dust particles.

Incorrect Tension Pressure

Improper tension is a common cause for belt tracking issues. If the tension is too low, there won't be enough pull to keep the belt in line. If the tension is too high, the tracking cylinder can be overwhelmed. There is a formula to determine abrasive belt tension. The formula is as follows:

$$\text{Tension Cylinder Area} = \pi \times \text{Radius}^2$$

$$\text{Abrasive Belt Tension} = \frac{(\text{Tension Cylinder Area} \times \text{Gauge Pressure PSI})}{\text{Belt Width}}$$

As an example, if you have a tension cylinder with a 3 inch inside diameter and a 1.5 inch radius, your air gauge PSI is 15 and you have an 18 inch wide belt, the calculation would be as follows:

$$\pi \times 1.52 = 7.065$$
$$(7.065 \times 15)/18 = 5.9 \text{ pounds of belt tension}$$

With this formula, you can ensure that you never have issues with improper tensioning.

Improperly Cut Belt

Belt tracking issues can occur if a sanding belt was not cut properly. It's easy to tell whether or not this is the case with a quick visual inspection of the belt.

Removal Rate Issues

Recurring belt tracking issues could also be the result of trying to remove too much material in one pass. A higher removal rate could be dislodging the belt.

Abrasive Material Storage Problems

As previously mentioned, belts will absorb moisture and when they do, they can lose their shape. Thus, your belts should be hung and not stored on the floor (especially not a concrete floor).

Uneven or Unparallel Rollers

Your belt can track improperly if the machine's rollers are uneven or not parallel. You can use a digital indicator to determine if the rollers are parallel and adjust accordingly. Uneven rollers can be easier to spot with the naked eye. If you have rollers that are uneven, the rollers will need to be flattened or recoated and then reinstalled

1.2 BELT BURNING OR OVERLOADING

Too much loading can lead to frequent belt replacement, which can become very costly very quickly. If there is too much loading or if the belt is burning and leaving black marks on your workpiece, there are probably technical or process issues that can be addressed to fix the problem.

Worn Belt

It's entirely possible that you're experiencing high loading or burn because the current belt is too old and worn. However, if your belts are wearing out faster than they should, there is definitely a greater problem in existence.

Improper Abrasive Storage

Improper storage is a recurring issue in the troubleshooting guide, as it can cause a lot of different issues. Again, hang your belts before use (preferably on a round rod) to prevent them from soaking up moisture and losing shape.

Removal Rate Issues

Load or burn issues may be caused in an attempt to remove too much in one pass. Different grits are designed to remove certain amounts of material at a time. It's always recommended to avoid skipping more than one grit in a sequence. The grit ranges for various applications can be found below:

Abrasive planing: 24-40 grit
Heavy stock removal: 50-80 grit
Cutting or surfacing: 100-150 grit
Finishing: 180-320 grit

Of course, the type of material you're running through your machine also plays a role in belt loading as well. Loading increases with a soft wood like pine, because the wood has a higher resin content. It's possible you may need to consider a different backing for your belts depending on your application. As previously mentioned, cloth is more durable and flexible. It may be the better choice in certain situations. If you're unsure, one of our experienced representatives can help you determine which abrasive product makes the most sense for your application.

Resin Buildup

Check your workpieces and ensure there is no resin or glue buildup on them before they run through the machine. The resin or glue can melt onto the belt due to the heat produced from the friction of sanding. Buildup on the belt can then create load and burning issues.

Sanding on One Belt Location

If you're not varying your entry point on the machine, that is something you'll definitely want to start doing. Constantly running workpieces through the sander in the same place on the belt can quickly wear out that portion of the belt and lead to loading and belt burning.

Compensating Machine Issues

It could be that there is a high sanding load to compensate for mechanical issues with the machine. There could be a faulty extraction system, a damaged contact roller or pad, a worn or damaged feed system, or poor alignment between the feed system and the sanding unit. All of these potential problems could be causing burning or load issues with your belt. It's worth inspecting all of these elements to ensure they are all functioning properly.

Inconsistent Workpiece Quality

There can be issues with the quality of the workpieces going into the sander that can affect the performance of your machine. Workpieces that aren't dry, have glue penetration, or insufficient edge milling can cause burnt belts or loading issues. You should inspect your workpieces before sending them through the sander to make sure the quality of the pieces going in is consistent.

1.3 EXCESSIVE DUST OR STATIC BUILDUP

If the inside of your sander has a lot of dust, there is likely an issue with the machine and it often shows in the materials run through the machine. Excessive dust buildup can result in burn marks or lines on the workpiece. Dust buildup can also cause tracking issues and prematurely wear out the belt.

If dust buildup seems to be an issue with your machine, you may have high static electricity, or low airflow due to a faulty dust extraction system. There are a few simple ways to diagnose these factors to determine what the root cause for dust may be.

Static Electricity Problems

Some static production is natural with abrasive machining, because sanding is a process of removing material through friction and friction results in static. In a high static environment, dust and waste created from sanding starts to stick and collect on the machine's inner-surfaces. You can check the static discharge produced from your machine with a static meter. If your static meter registers a reading of more than +/- .01 then there is too much static production and your sander will need grounding.

To ground your sander, you'll want to run a metal rod from several feet below the shop ground up to the conveyor bed of your machine. If your machine isn't on the ground floor, you'll want to try to connect the conveyor bed to a support beam that touches the ground. It's best to consult an expert if you have doubts in your ability to properly ground your machine.

Identifying a Faulty Dust Extraction System

The first step in troubleshooting your dust extraction system should be to inspect the system for clogs. If there doesn't seem to be any clogs, you'll want to measure the air flow for your dust extraction system with an air flow meter. You should be able to find a recommended rating in the manufacturer's specifications for the system. If the reading in on your meter is off from the manufacturer's specifications, there is likely a problem with your dust extraction system and you'll need to call the manufacturer to get the system repaired or replaced.

Climate Issues

Outside of a lack of grounding for your machine, the climate within your shop could also be creating static issues. There is low humidity in cold climates, which creates an environment that is more conducive to static electricity. If you're having problems with excessive static electricity, try raising the temperature in your shop.

1.4 A BROKEN OR DAMAGED BELT

If your sanding belts are constantly damaged with broken joints, frayed edges, or tears, then there is likely something wrong. If belts are breaking toward the end of their expected lifespan, there may not be an issue. However, if your belts are prematurely breaking, it's probably time to start doing some investigating.

Faulty Belt Joint

A faulty belt joint could be the result of manufacturing (causing the joint to pop and separate under pressure), but it's more common for belt joints to simply weaken and break over time. The one thing you'll want to check to prevent premature belt joint breakage is the recommended direction for your belt. Some belts have joints that are designed to be bidirectional (they work well going both directions) while others are only unidirectional. If your belt joint is unidirectional, you'll want to make sure your belt is traveling in the proper direction.

Excessive Loading

Excessive loading is a very common cause of belt breakage. Excessive loading could be the result of foreign particles in the machine or a large variation in workpiece thickness. You'll want to make sure your workpieces are clear of dirt and other residue before running them through the machine. You'll also want to make sure your workpieces are the same thickness. The last thing you'll want to double check is the grit sequence to ensure you're using the right one for your application.

Storage, Packing, and Shipping Damage

Belts need to be carefully packed and unpacked from shipping to protect their integrity. When storing belts, do not keep them on the ground. Belts absorb moisture and they will absorb moisture from the concrete or floor. It's advised to hang belts up before use. When you're ready to use a belt, verify the quality before loading and ensure the belt doesn't catch on anything it shouldn't when it is loaded.

Incorrect Belt Backing

Choosing the right backing is crucial for both avoiding sanding issues and preventing belt breakage. Belts with a paper backing may provide a smoother finish, but they can also break easier. Cloth may be a better fit if your application requires a more durable or flexible abrasive. Use of a cloth abrasive can prevent creases, tears, or breakage in many situations.

Improper Tracking

If a belt isn't tracking properly (the belt is sliding off the rollers or it is mis-aligned while running), then a tear in the belt is more likely to occur. Improper belt tracking can have a number of different causes. Refer to point 1.1 for a list detailing the problems and solutions associated with belt tracking.

2.1 CHATTER MARKS

Chatter marks are consistent, even lines that can appear on a workpiece after being run through a wide belt sander. When chatter marks appear, many jump to the conclusion that there is something wrong with the abrasive belt, but that's not always the case. There are a number of other causes for chatter marks.

Worn Contact Roller

If your contact roller is worn out of round or out of balance, chatter marks could be created. You may also be using the wrong type of contact roller for your application. Hard durometer or metal rollers are strictly for stock removal purposes.

Incorrect Belt Joint Style

It's entirely possible you may also be using the wrong belt joint style for your application. You'll want to ensure that your belt has the proper joint and isn't held together by tape that is too thick for your needs.

Formulas

When trying to diagnose whether or not chatter marks are the result of a belt join or roller problem, there are formulas you can use to compare the actual distance between fault lines to what the distance would be if the issue were stemming from the belt join or roller.

Belt Join:

$$\frac{\text{(belt length mm) x (feed speed, m/min)}}{\text{(belt speed m/s) x 60 x (number of joints)}} = \text{Distance between fault marks in mm}$$

Roller:

$$\frac{\text{(circumference of roller mm) x (feed speed, m/min)}}{\text{[(belt speed, m/s) x 60]}} = \text{Distance between fault marks in mm}$$

If your marks match up to one of the distances provided by either formula, then you've likely found your root cause for the chatter marks.

Wrong Tension Pressure

Chatter marks can also occur if tension pressure isn't set correctly. Tension pressure will vary depending on the belt type. Recommended tension pressure by belt type is as follows:

Paper: 45-55 psi
Cloth: 55-65 psi
Polyester: 65-85 psi

Worn Bearings

This is a less common cause for chatter marks, but if the bearings on your contact or idler roller are worn out, chatter marks can be created.

Worn Conveyor Belt

A worn or slick conveyor belt can also create chatter marks. If your conveyor belt is worn out, you can try applying a cleaner to remove dust and debri that may be creating friction with the belt.

Feed Roller Adjustment Out

Hold down rollers need to be adjusted based on your workpiece thickness and your sanding application. If your hold down rollers aren't properly adjusted, chatter marks can be created.

Improper Grit Sequencing

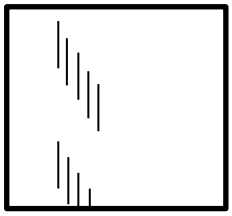
This is only a relevant issue for a multi-head sanding machine. If you're using a multi-head machine, you'll want to check to make sure you're using the proper grit sequence and stock removal rate. Do not skip more than one grit in the sequence.

2.2 RIDGES

Ridges or raised lines on a workpiece can have many different causes. You can narrow down the potential cause by studying the patterns in the ridges. Different patterns could be the result of different issues. Patterns and their meaning can be found below:

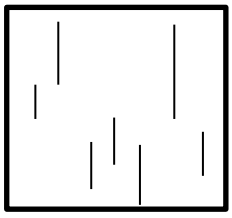
Short, close ridges in a step formation

- Sanding pressure may be too high
- The pad may be too hard and too wide
- The belt speed may be too low
- The belt may be slightly clogged
- There may be too much stock removal



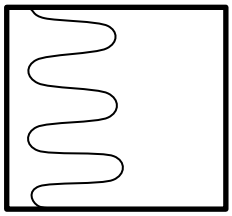
Medium-length ridges spread apart in a random formation

- The belt speed may be too low or too high
- There may be poor dust extraction
- Sanding pressure may be too high
- There may be too much stock removal
- The belt may not be properly cleaned



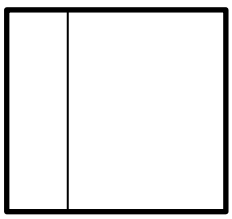
Wavy Lines

- Impurities in the workpiece may have damaged the abrasive grains
- Part of the belt may be clogged



A single straight line running the length of the piece

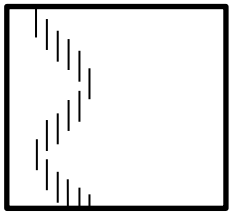
- The contact roller may be damaged
- The graphite cloth might be damaged
- The felt may be compressed



2.3 SCRATCHES OR GROOVED LINES

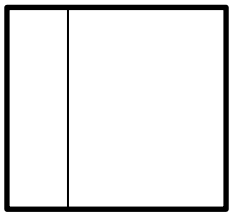
The opposite of raised ridges; scratches or grooves can occur in different patterns just like ridges. Like ridges, different patterns have different root causes. Patterns and their meaning for scratches and grooves can be found below:

Short parallel lines in wave formation



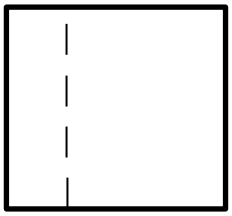
- There may be cracks in the abrasive coating
- The belt joint may be contaminated

A single straight line spanning the length of the piece



- The pressure beams may be contaminated
- The graphite cloth may be contaminated

A dashed line along the length of the piece



- The pressure rollers are likely contaminated

2.4 WAVY SURFACES

Wavy surfaces, or consistent peaks and valleys in your workpiece could be related to an issue with the machine or the sandpaper you are using. There are a few common causes, which can be found below.

Soft or Damaged Roller

Depending on your application, your roller may be too soft, which could be creating wavy surfaces. A damaged roller can also create a wave.

Removal Rate Issues or High Sanding Pressure

Platens are typically used for finishing on wide belt sanders. If you're trying to remove too much stock you can get waves with the platen. If you have a pad that is too flexible, or your sanding pressure is too high, you can also get a wavy surface.

Excessive Belt Loading

Excessive belt loading can create waves in the workpiece. Fortunately, we discussed troubleshooting belt loading issues further up in the troubleshooting guide, so you should be able to diagnose and resolve the issue fairly easily.

Unsuitable Grit Combination

If you are skipping too many grits, it's possible you have an unsuitable grit combination that is creating waves. The bad grit combination likely lies in the #80-150 and #100-180 ranges. You'll want to review your grit choices and consider other options.