Introduction

Many advances have taken place since diamond chains became commercially available for cutting concrete. Diamonds, saws and the chains themselves have all evolved significantly along with the best practices for this discipline. This document highlights some of the changes and will help contractors get the most out of the concrete chain saws they own.

The earliest diamond chains were almost prohibitively expensive, but the unique utility of diamond chains allowed pro-cutters to perform cuts that would have been otherwise nearly impossible. The benefits of a chain were promising enough to encourage producers to improve the technology over time. There are chains on the market that may physically resemble those early chains, but that is where the resemblance ends. From larger chain components, better diamond segments, advances in heat-treating and laser welding to rivet joint sealing technology, today’s chains are worlds apart in performance and cost of use.

Initially, diamond chain for concrete was only available on hydraulic-powered saws. While hydraulic-power is still available and has its own real advantages, high-frequency saws, pneumatic saws and gas-powered saws have been added to the market and there are situations where each type has an advantage over the others.

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1. Starting a Cut

The best way to start any cut with a concrete chain saw is to plunge cut. Rev the saw up to full RPM and slowly push the nose of the bar into the cut. Unlike a wood cutting chain saw, there is no rotational kickback. In fact, cutting with the nose of the bar, plunging straight into the wall is the fastest method of cutting and the preferred method of starting all cuts. When making the first cut:

- Outline the cut with a permanent marker.
- Start the saw and, after a brief warm-up period, rev and hold the trigger at full throttle. Always use full throttle when cutting.
- Score the entire cut line approximately 0.5-inch deep using the nose of the guide bar. Next, deepen the cut by about 2 inches.
- If using with other methods, do not follow a narrower blade with the chainsaw as snagging may occur.
Always operate the concrete saw at full throttle. If too much force is applied, the saw will lug or stall. The chain will not have enough speed to cut effectively. If too little feed force is applied, the diamonds will skid and glaze over. Plunge cut instead of starting at the top surface of the wall. This will reduce chatter, extend diamond life, create a straighter cut and more quickly enable the use of the WallWalker (if equipped). When cutting heavy rebar, slowly "rock" the saw to be always cutting concrete as well as steel. This will help keep the diamonds exposed. Also, expect less chain life when cutting heavy rebar. Expect more chain stretch when making nose-buried cuts for extended periods of time, as the chain does not have a chance to "throw" the slurry away from the nose of the guide bar.

If the saw begins to cut consistently crooked, stop the saw, remove the bar and chain and turn the bar over and use the other side. Dress worn rails with a belt sander. The guide bar is solely a guide track for the chain. Never use the guide bar to lift, twist or pry concrete material. When using a new chain, the initial cutting speed can be increased by “opening up the diamonds.” This can be accomplished by first making a few cuts in an abrasive material such as a cinder block or brick.
2. **Chain Selection**

It is important to select the correct chain for the job as a contractor may have more than one type in use. Like other cutting systems and technologies, there are different diamond segment “recipes” for cutting different types of material. These recipes are formulated specifically for cutting these material types and choosing the right segment will not only improve performance, but can save time and money.

3. **Chain Tension**

Tension the chain so that one drive link is completely out of the groove and the rest of the drive links are at least partially inside the groove. The chain should be loose enough that it can easily be pulled around the guide bar by hand. Horizontal cutting and longer chain lengths require greater chain tensioning discipline because there is a higher chance of chain coming out of the groove during cutting. Excessively loose chain tension may also allow the chain to skip over the teeth of the drive sprocket, causing damage to the drive links. Over tensioning the chain will increase nose sprocket and drive sprocket wear, accelerate chain stretch and rob the cutting system of power.

4. **Bar Rail Maintenance**

Guide bars are designed to be used on both sides. Just like rotating tires, the bar will last longer if wear is evened out. Turn the guide bar over periodically to maximize usage. A guide bar is at end of life when both sets of guide bar rails are worn to a point where the drive-links bottom out in the groove.

5. **Nose Sprockets**

The nose sprocket inside the guide bar is cooled and lubricated with water. Most guide bars have water channels inside that deliver water to the chain drive link groove and also into the roller bearings inside the nose sprocket. Dirty water or water scum inside portable storage tanks can clog guide bar internal water ports and starve these critical components of cooling and lubrication. To improve the longevity of the nose sprocket:

- Ensure clean or filtered water is supplied. Free run the saw with water flowing for several seconds after cutting to thoroughly flush the nose sprocket with water.
- Promptly apply a film of lightweight oil to the entire cutting system, with particular attention to the nose sprocket.
- Never cut into subgrade with a chain saw.
6. **Drive Sprockets**

The drive sprocket on a concrete chain saw is a critical part of the cutting system because it is where power is introduced to the chain. Drive sprockets do wear out over time and exceeding the normal operating life of the drive sprocket will lead to chain and sprocket interface slippage, causing damage to the chain drive links. It is important to understand how to avoid excessive wear and when it is time to replace a drive sprocket.

Grooving of the teeth on the drive sprocket is a normal wearing action that occurs because of abrasive slurry moving between the chain and drive sprocket during operation. Although new drive sprockets are not directional and may be installed either way, the direction of rotation should be maintained for the entire life of the drive sprocket. Reversing the direction will lead to drive links pinching in the groove. For best results and to improve the longevity of your drive sprocket:

- Avoid excessive chain tension as this accelerates drive sprocket grooving.
- Ensure sufficient water flow as inadequate water supply accelerates drive sprocket grooving.
- Replace the drive sprocket the teeth become sharply pointed or the drive links have work 75 percent of the way through.

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7. Water Supply

Water is necessary to keep the cutting system working properly and a good water supply will help to maximize the life of all of the components. Here are a few final points about water supply to remember:

- Minimum water pressure required is 20 psi.
- If using a portable water supply, ensure the pump is supplying adequate water pressure output.
- Screen or filter any portable water to ensure a clean water supply.
- Periodically replace the inline hose screen at the hose bib if using a conventional water hose.
- Chain saws should never be run dry.

Adequate water pressure and lubrication in storage are the keys to maximizing guide bar nose sprocket life.

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