ALL You ever Wanted To Know About Doctor Blade Chambers, But Were Afraid To Ask

While enclosed chambered doctor blade systems are becoming more and more prominent within the printing industry, our knowledge level of this component has a little to be desired. While utilizing the enclosed chambered system for several years, there were times when it didn't work right and also times when it just don't work.

I am going to share with you the easiest and simplest way to check your doctor blade systems and how to make sure that they are working to their utmost efficiency. It's not rocket science, but rather a commonsensical approach. This information will help you, the printer, cut down your cost as well as reduce your downtime substantially.

The following are my thoughts on when doctor blade systems are no longer functional. Many printers suffer with anilox damage issues and other print problems without realizing the root cause is their chambers. In fact, the cause and the solution to these problems are complex. However, there are several basic elements that should be considered when looking for a solution.

When Doctor Blade Chambers Die

1) **Doctor Blade Chambers -**
   The quality and condition of the blade chamber is the most fundamental element of your success in eliminating excessive anilox roll damage / wear problems. What many flexo printers fail to realize is that the chamber is a wearing or aging part of the press. When a chamber is new, the end seals make simultaneous anilox contact first, followed by the blades. The entire length of both, the upper and lower blades should make contact with the anilox at the same moment. For this to happen, the dimension and tolerance of the chamber, the bracketry, the chamber- to- anilox loading mechanism, the blade platform and clamping mechanism, and the blades themselves are critical. From press start up, with the exception of the blades, each of these variables continually degrades. How fast and how significant the deterioration of the chamber is depends on factors such as average length of runs, types of inks, solvents and amines, housekeeping, preventive maintenance and the experience and skill level of the crew. The bottom line is that eventually, a chamber will become so warped and so degraded in all its critical dimensions that replacement is the only option. Normally, this occurs somewhere between 4 and 8 years from initial start up.

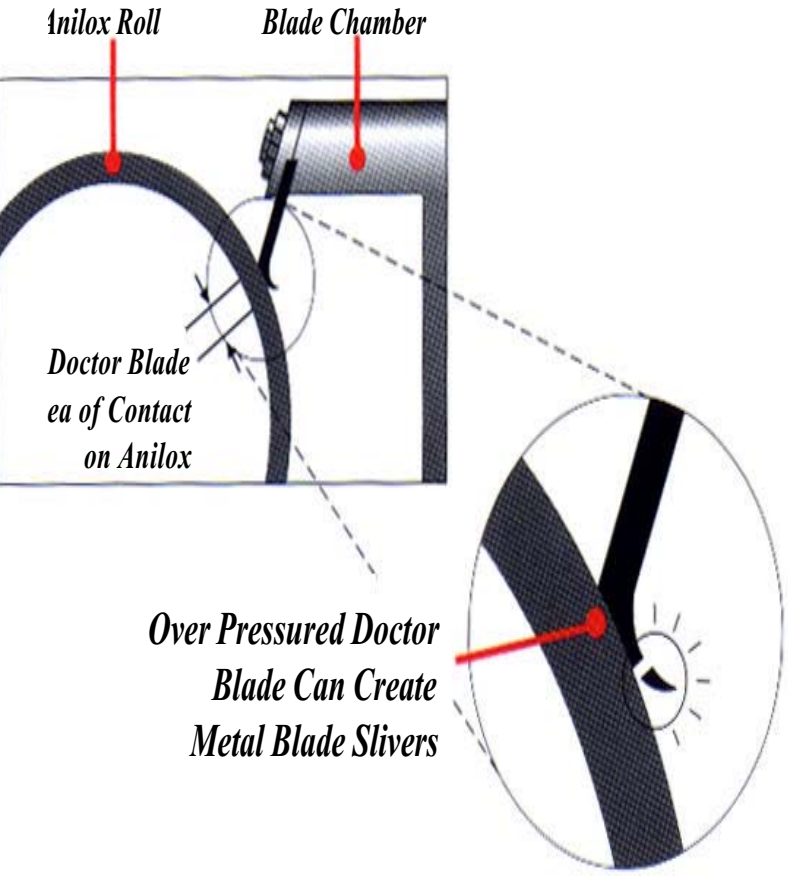
2) **When Doctor Blade Chambers die---**
   So how does one know when a chamber is shot? Tell tale signs are excessive end seal leaking, blade clamp leaking, excessive anilox roll wear, damage and accelerated blade wear. While the cost of operating worn chambers is huge,

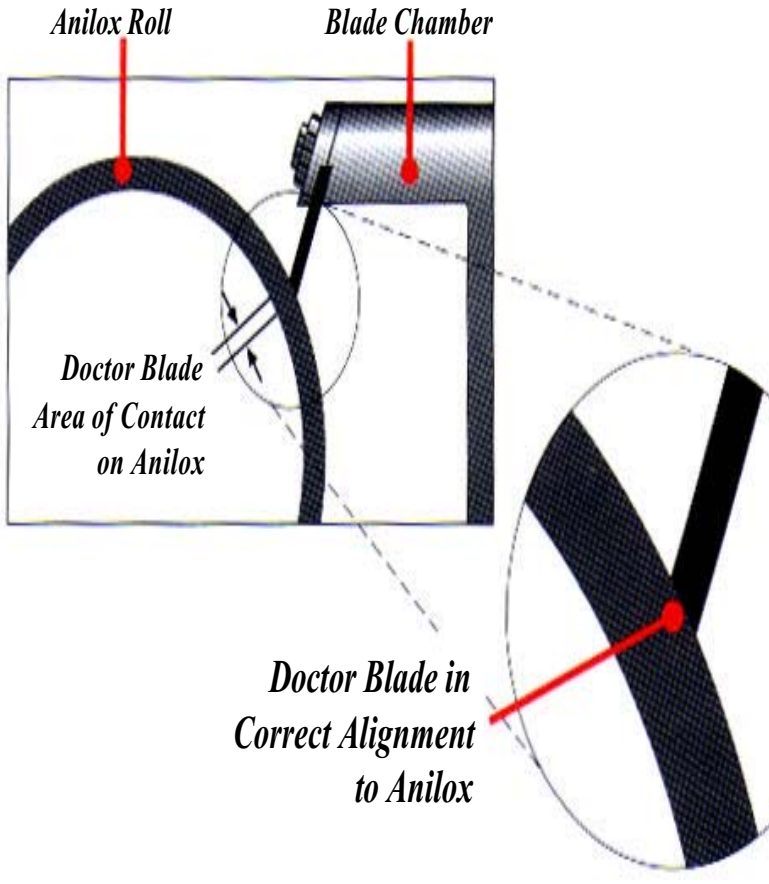
many printers delay their replacement or try stopgap measures from re-matching clamps to modifying loading mechanisms. These measures almost always fall far short of solving the problems.

3) **Why Not Rebuild Your Old Chambers????**
Once a chamber is significantly out of specification, especially if it is the result of deterioration or warp, there is no cost effective stopgap measure that can be done to bring the initial blade to anilox contact tolerance back to ± .002".

4) **Gauge/Thickness & Contact Area/Angle---**
While a general rule of thumb is that one should select the thinnest blade capable of metering an ink film, what is really being said is that you should have the least amount of contact area between the blade and the anilox. In fact, recent indications now suggest, less contact will be achieved by using a thicker blade. The following are examples of possible metering blade contact areas based on 3 common gauges.

	Blade gauge	contact area angle
	.006''	.017'' - .032
	.008''	.015'' - .028
	.010''	.014'' - .020
maximum	.006''	.048''
minimum	.010''	.012''





In addition to gauge and pressure, the actual contact area is also contingent upon the initial set angle of the chamber and the blade's extension (the amount of blade extending unsupported from the clamp). By measuring the used blades, we can determine which blade gauge is the best fit for the specific system.

Another benefit of running a thicker blade will be the reduction of "Tip Flutter". Tip flutter is the phenomena that occurs when a blade has buckled or bent so far over that the actual tip of the blade no longer touches the anilox surface. When this occurs, ink can push the blade back from the anilox surface allowing increased ink to pass. The resulting increased ink film can either be overall or in varying waves across the anilox.

5) **Ink Starvation/Dry Running/Scoring**
There are several things that can be done to counter ink starvation or dry running the press. These two culprits will definitely cause score lines on the anilox roll. On a chamber where you have an in-feed line and an out-feed line, always check the hose sizes. Visualizing that the ink is pumped in the chamber and either pumped out or gravity fed, it must fill the chamber to release a smooth, even film of ink. Sometimes, on the outlet side, the ink does not make it to the top of the lead edge blade and the starvation of the ink occurs on that side of the anilox roll. You can increase the pump pressure/speed, but it may already be maximized out or too much pressure may cause blade tip flutter or excessive end seal leaking. ---Another way to fix the problem or significantly reduce it is to take a pair of vicegrips and partially squeeze the return hose. This should back enough ink into the chamber and eliminate or reduce the starvation problem. If this works, either reduce the outlet hose diameter size or mount a small piece of steel over the return hole to slow down the ink return.

6) **Checking for Chamber Parallelism**
This is another common problem within this industry. The way to check for this is, using a caliper or measuring tape, measure the distance between the lead blade and containment blade in increments of inches all the way down the chamber. The gap distance should be no greater than +/- .007'' variance.
If the gap is greater than +/- .007, disassemble the chamber and measure the distance from the blade back stop in the clamp on one side to the back stop on the other side. Again this should be within .007''. This will determine whether it is a chamber problem, an assembly problem or a house keeping /cleaning problem.
Also, place the chamber back side down on a flat surface to determine if it is bent, bowed or twisted. You should check with a feeler gauge and visually see if light passes through it.

Summary: Though, not mentioned in this data, end seals play a very important role on how an enclosed chamber system will perform. End seal leaking, excessive blade wear, premature anilox wear, score lines on the anilox, excessive ink waste and downtime all are factored in with end seal issues.

A cheap end seal material can cost you a lot of money. A quality, precisely cut end seal, will extend your blade life, reduce your ink waste, and extend the life of your anilox roll.

This data was obtained from resources and mostly, practical experience. Having the luxury of focusing on products and things like this gives us the opportunity to learn more about specific press components and possible solutions. Hopefully, this information will be helpful to all of you.

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