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Printing Press Alignment — Crucial Points for Critical Quality

Blaming poor quality on people or consumables? The problem could be as simple as your press moving out of alignment from its original position.

The boss says a new semi-automatic press is coming in next week and it has been assigned to you as “your” press.

The press arrives for installation, and you have it painstakingly positioned, leveled, hooked-up, debugged and cycled. You take the operation instructions in hand and — away you go.

Sometime later, perhaps just a short six months or so, you begin to realize you’re not getting the tolerance preciseness or quality levels of the print finish you have newly come to expect. You instantly blame poor screens, stencils or a lower standard of in-house techniques for the cause, only because you and the press are just fine!

Yet in reality, the problem could be nothing more than the press has simply moved out of alignment from its original state. In other words, one or more of its critical parts has moved out of alignment to another, thereby rendering an imbalance in the quality of print performance to some degree.

When a new or used press is first installed, one assumes it has been correctly leveled.

After all, it was set up by a professional factory-trained technician — right?

While that may be true, from the machine’s unit base standpoint, there are several other physical components to consider for aligning purposes also.

In fact, while this article addresses any type and age of a printing press, it is aimed more at routine checking of older/established presses in existing production. Beware, however. Presses are not always equal. The same applies to setups initiated by the installer, particularly with new equipment. Understandably, it is easy to assume that the alignment of one part to another was taken care of at the factory before shipping.

Irrespective of printing machines’ quality or level of sophistication, they will all go physically out of alignment at varying degrees, from wear and tear depending on usage and abuse, as well as operators adjusting incorrectly. Since we all know problems will occur if the squeegee or screen is not properly level to the print table, it is therefore desirable to regularly

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check alignment, thereby maintaining mechanical integrity to ensure lasting and unimpeded quality with high image accuracy. Quality is not possible otherwise.

Where, what and how to realign has everything to do with the very nature, design and type of equipment requiring it. For instance, the print table may either be fixed (leveling-wise) to the machine's base or be independently adjustable in all four corners. The master frame (screen) carrier is usually adjustable to the print table with most presses. Even if it is not possible on a particular press to level one component to another as described, you can find a method to render some form of correct alignment if the two are out.

For instance, if the master frame carrier inside the print-head cannot be adjusted independently without restrictions, then clearly, the print-head has to be adjusted to compensate accordingly. If in doubt as to how or what can or cannot be done, simply consult the operating/maintenance manual or speak with the original equipment manufacturer's (OEM) service manager or field technician.

At least four parts, or components, of a printing press need to be leveled or, more exactly speaking, aligned. Regardless of whether the press is fresh from the factory or just acquired as used, the four components are still the:

- base unit (chassis),
- print table,
- master frame (screen) carrier, and
- squeegee carriage.



THE CHASSIS

First and foremost is the chassis, or base unit of the press. Many modern printers today work on a camshaft principle, where cams are finely balanced along the shaft's entire length. If the equipment is not properly leveled, the shaft will start to oscillate, which eventually will begin to exert damaging pressure on other operation functions. This is especially an issue with most 4-post models, and a concern with other large format flatbeds, as well as cylinder presses.

Regardless of camshaft-driven machines, the chassis ought to be leveled as the fixed datum point for the unit, so that all other components can correspondingly be leveled from it. There is nothing to gain by aligning one component against another that has not already been leveled correctly. This could lead to vibration and undue

wear and tear that will potentially and dramatically diminish the useful life of the press.

The ideal place to check the level of equipment to the floor (A in the illustration) is to use a quality machinist leveler on the chassis' uppermost horizontal bare cross members, as opposed to using the lower ones.

To do this properly, all metal sheets, protective guards or decorative coverings should be removed so that the leveler is placed on a smooth surface,

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without screw-heads appearing or paint-work bumps and the like. Once the base unit has been leveled, companies will often request that foot plates be anchored to the floor so the press becomes a permanent fixture. Any time a press is repositioned, even just a few feet away, the whole realigning procedure needs to be redone thoroughly.

THE PRINT TABLE

After the chassis is aligned, then the print table is aligned to the base (chassis actually) in both 'X' and 'Y' direction (B in the illustration). The alignment process may take a little time to get this done accurately but it's worth the trouble. Without overdoing it, tighten or lock up the adjusters as needed.

THE MASTER FRAME CARRIER

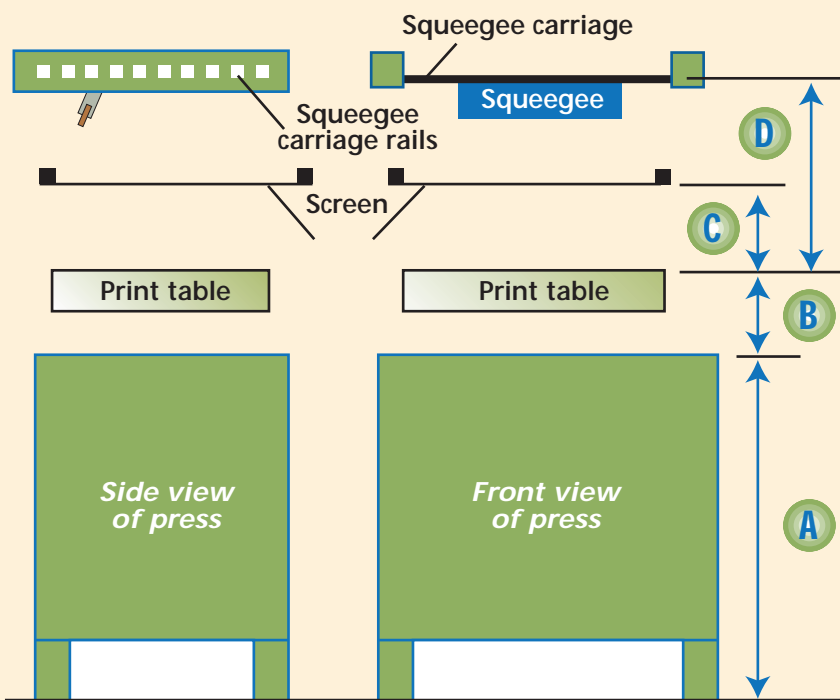
Next, align the master frame carrier to the table, regardless of whether the press is a clamshell, 4-post or parallelogram type (C in the illustration).

At this point, we are more concerned with the screen being level rather than the print-head — although that could be a problem with the next step.

The mechanism that holds the screen frame — usually referred to as the master frame carrier — should be leveled to all four corners of the print table. However, since the frame carrier and screen clamping system differ for each type of press, it may be more beneficial in some instances to insert and lock in a screen and then level this to the table for greater accuracy of "screen-to-table" alignment.

In order to do this alignment properly, the peel-off mechanism must be zeroed or inoperable. Furthermore, you have the chance to easily check

Correct Procedure to Align a Flatbed Printer



Leveling instructions in 'X' and 'Y' direction

- A** Machine's chassis to the floor
- B** Print table's surface to the chassis
- C** Screen-to-table & squeegee in length direction
- D** Squeegee carriage travel length-to-table



the squeegee bridge mechanism alignment to the table (across the squeegee length direction). This should be done without a squeegee inserted, air pressure off and mechanical pressure adjustments backed off fully, or set equally if using dial gauges.

When this has been done, the squeegee mechanism is now set parallel to the table for optimum relationship.

THE SQUEEGEE CARRIAGE

Finally and perhaps the most important to do, is to align the whole squeegee travel length to the table (D in the illustration).

This is not hard to do, and yet it is the least considered for alignment. Any misalignment here could potentially represent the most damaging results in terms of critical print quality. Any irregularities in the squeegee carriage have a direct result in image distortion, inferior print finish and poor uniformity of ink deposit.

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As mentioned previously, to do this job properly, it may well mean adjusting the machine's print-head to accommodate squeegee travel alignment satisfactorily.

ROUTINE CHECKS PAY OFF

Once corrected, the on-going alignment of each press should consist of nothing more than routine periodic

checks. If your equipment has not been aligned since installation — regardless of age — you're way overdue for checking. You may well be printing rejects just for the fun of it! Poorly aligned equipment cannot possibly function properly, at least to its peak or meaningful performance.

I have given you only general symptoms of what happens when a press is out of alignment. In many respects, the metal parts of a press — as a mechanically precise moving device — are not unlike the working bones of the human body. Misalignment here or there means the body will not function as normal—until it has been readjusted. Ask any chiropractor how many things can be affected or go wrong when just one part of the body is misaligned. The chiropractor has seen an endless parade of problems that occur. Yet the human body only has about 200 bones — while a typical press may have well over 2,000 parts!