Magnus (Auto) Install at Quad Graphics: Sussex Wisconsin

Monday June 27 2005:

1. Arrived onsite at around 9:00 and did a quick inspection of the installation location:
   - Site preparation had been done and floor markings were well laid out and easy to see
   - Alignment to processor was unnecessary as processor has not yet been installed
   - Network, air and power had not yet been installed
   - Noted that the level of the floor was not that good
   - Customer asked the wavelength of laser, TH2 & TH3.

Garbage disposal is an issue that needs to be addressed. **Black cable ties on a black floor; is actually a major safety hazard**. The likelihood of someone slipping and hurting themselves is far greater than anyone ever being hurt by the laser. (This also applies to production at Annasis)

2. Machine arrived on site at around 9:00am and was unloaded from truck:
   - Unpacking the machine was somewhat disorganized
   - SSR rollers had come off bin rail on one side and as a result the SSR was wedged into the bin. Also both jacks had been removed **(This was mentioned in previous installation report from December 2004)**
   - Foam is still being wedged between the front beam and unload table **(This was mentioned in previous installation report from December 2004)**.

Two to eight hours could be saved during each installation if packaging was better organized and FSE's knew exactly where each crate should be placed to facilitate an order of operations

3. Rolled base unit into pre-press room and positioned for leveling:
   - Jack adaptors needed to be ground, because they did not fit into the rear jacking locations **(This was mentioned in previous installation report from December 2004)**
   - The leveling procedure of base, wiredframe, and MCU needs to be understood better by everyone. It should also be made clear that it is possible for the MCU to be balanced only on two feet (outriggers must be used), and the other half of the machine could be only resting on 3 of the 5 feet
   - Safety pins for the jacking operation are not supplied in the tool kit (Their use is also not well known)
   - Bell washers are still being used on the left side of the drum motor cooling fan (large drum), no washers needed on left side
   - Foam fire guard not accurately located under drum motor, still gaps showing

- The front shipping pins that connect wireframe with engine casting were not accurately located and began to get tight at 0.1 degrees. This is significant because when doing initial alignments the machine needs to be brought into level evenly or the front shipping pins must be taken out.

4. Installed MAB's, pull-out frame support beam, power box and extension:
- Three pem nuts on the MAB's that secure the pull-out frame support had come loose
- It is important to note that the pull-out frame support beam has oblongs at its mounting location and can be mounted 5mm closer or further from the drum. **To avoid problems installing load table rails mount this beam further from the drum.** Also note that this is good slop because it can compensate for small movements of the MAB's on the pillow blocks
- Not all FSE's are aware of how to use the MAB to pillow block pins (690-00276A), and what to do if the MAB's are out of alignment **(This was mentioned in previous installation report from December 2004)**
- One of the two screws securing the Hall sensor cable was missing.

5. Installed pull-out wheel guides and load table traveler guides

6. Installed pull-out load table and Fetcher track:
- The fetcher track is labeled with "home" twice. One instance is for the pull-out table locks, and the other is for the fetcher home sensor. Five minutes of confusion could be avoided if the pull-out table lock home was labeled "POTL HOME"
- Fetcher track can also be installed at an angle (not parallel with drum) due to slop in the mounting locations and should be kept in mind while installing. This is actually good slop because it can compensate for small movements of the MAB on the pillow block
- When installing the fetcher track, **do not remove MAB end covers**. Instead mark and remove the SSR font panel bracket from the track (3 screws as opposed to 16 for the front covers), and then fish the track through
- Fetcher Safe Home sensor bracket was bent, creating interference between sensor and the tab on the Fetcher. Clearance should be checked by FSE's before initializing the machine.

7. Installed Ejector track, unload table pull-out section, and unload table traveler:
- **The tightening of the load and unload table belts is still voodoo science**. If the belts had been secured according to the disassembly marks they would have been way too tight. Currently the belt tensions can produce the most amount of noise on the machine
- Ejector track position was not marked. It could save five minutes per installation if it was marked.

8. Installed unload table left and right wide panels:
- **These panels both needed to be reworked**, because of an interference with the cut out in the unload table and the stiffener on the backside of the panel. Both of these panels also need to be seated better to avoid problems with the Ejector; Velcro is not an adequate solution.

9. Installed lower shoulder panels

10. Installed Ejector:

- The Ejector has a feature on the end of it that use to be used for leveling. This feature is no longer used; as well the jacking screw on the feature is too long and can hit the darts on the table depending on how the Ejector has been set up
- Documentation is needed if it does not already exist, on how to troubleshoot the Ejector for FSE's. **(This was mentioned in previous installation report from December 2004)**

11. Installed hot air exhaust, left and right sub panels, debris and chiller units:
- FSE's still need to be informed of the tether that attaches to the chiller unit
- The debris unit needs to be secured to the wiredframe to ensure the debris exhaust is lined up with the hot air exhaust and the vacuum hose needs to be secured with cable ties to the top of the hot air exhaust so that the MAB to skin panels will fit properly; access is easier if this is done before installing the bridge.

12. Installed Bridge and all related hardware:
- A useful note would be to connect the bridge in position sensor (E35),before installing the rear bridge panel
- The bridge transition panel was secured and located with sock-head cap screws, which esthetically does not look good
- The bridge transition panel needs a ramp or better way of securing it, so that the ejector does not make a loud noise when traveling over it. Currently there can be a 2-10mm bump
- The MAB to skin panels also need a better interface (ramp) so that noise from the fetcher is reduced.

13. Began installing all jewelry onto the MCU:
- No major difficulties, but it is worth noting that installing the SSR top cover is easier to do when the MCU has not yet been connected to the base device.

Tuesday June 28 2005:

14. Arrived on site at 8:00am and started to re-level the device:
- This must be done as the level always changes, and may not be written in the procedure.

15. Prepared for the alignment of MCU to base device:
- There is an interference problem between the bracket coming off the drum vacuum plumbing and the cable-air panel. This panel must be removed to install the MCU alignment jigs. Note that this new way of securing the panel was a result of people not being able to see the previous location where the panel was secured.

16. Positioned MCU into rough alignment:
- There is no 18mm socket included with the tool kit making the removal of the MCU castors difficult **(This was mentioned in previous installation report from December 2004)**.

17. Continued with MCU various alignments (The fun begins)
- **The Plate exit panel is not plum (88.3 degrees)**, which is the reason for the need of shims under the picker, and also the reason the SSR rear door does not esthetically look good (Customer noticed). **This also has the potential of**

creating other problems, like the separator air coming out at a different angle, which could lead to SS errors (or has the separator been tested through various angles?) The first picks of MT098 at Sussex resulted in the slip sheets being blown to the back of the MCU

- Cassette cart dampener was not set properly. Having the dampener barely engaging may be easier for production while using service shell, but when using print console there will be no problem with have more engagement
- Cassette cart home and park roller switches were touching the edge of the cutout in the cart, creating a mild interference problem. **Rework was needed to increase the size of the cutout**
- One of the pem nuts securing the cart pin down bracket came loose. This problem was corrected
- No UHMW tape on the ends of the cassette
- Cassette cart drifting problem. **It took a good 2 hours of (insert profanity) to make it so the cassette cart did not drift.** If this problem is let go it creates another problem of the cassette being skewed on the forks which is basically the start of a huge tolerance stack up of plate coming in parallel to the drum or not, which in extreme cases can cause loading problems
- Cassettes do not touch the rollers on the plenum even with the side access door closed. **Gap between the rear plenum roller and cassette was 0.5mm and the other side was 4.5mm**
- The distance between plenum and cassette #4 was 50mm on one side of the cassette (50mm is correct value) and 55mm on the other side of the cassette
- Some of the rollers on the cassette forks had their securing bolt tight and roller was in high position. After correcting this the difference between each side of the cassette and the plenum dropped by 2mm
- Cassettes are resting slightly on a weld at the end of the forks
- Pressure on the right pcup is slightly higher than on the left, resulting in the left pcup coming down before the right, any problems this may cause might be being corrected by the fact that the cassette is resting at an opposite angle, but this is not likely over the distance between pcups and should be investigated further
- Small counter weights might be needed to get both pcups level during picking
- Operators had a comment about the cassette door as follows, **“Nice finger guillotine”** On a positive note, they really liked the FPL MCU compared to the one in Hartford
- MCU outriggers must be used
- A procedure is needed for FSE’s if there is not already one, on how to test the auto lubricating system for the MCU screw
- Something that might be worth investigating is if the plenum is parallel to the forks.

Wednesday June 29 2005:

18. Arrived onsite at 8:00am:
- Network connection not yet installed, intermittent air as maintenance worked on a final solution.

19. Went through Fetcher, Ejector, and unload table alignments:
- The left and right wide unload table panels were not seated well (4mm difference along the length of the panel) making ejector alignment somewhat challenging
- The jacking screw at the end of the Ejector was hitting the table darts, and needed to be removed
- Most of the Fetcher alignments were good except for the distance between the SSR wings in the up position and the bottom of fetcher. This distance should be 1-3mm, but was found to be 5mm and was corrected
- It would be useful to have a troubleshooting and alignment document on the Fetcher for the FSE's, if one does not already exists. **(This was mentioned in previous installation report from December 2004)**

20. Installed all remaining panels:
- Panel alignment was less than adequate. It is to be expected that some of the alignments will change during shipping, but these only account for minor adjustments. FSE's do not have the time during and installation to be doing major panel adjustments
- Customer also noticed the rear hood was bowed and out of alignment and asked if it was intentional
- The panel alignment jigs (690-00116A) that come with the tool kit are still not well known
- The SSR front panel was scratched and dented. **The customer has asked that this panel be replaced**. (note it could have been the maintenance workers that damaged the panel as they were working above installing a hard air line, but felt it better not to argue blame)
- The SSR front panel also does not install easily and can easily pinch the interface wire while it is being installed
- The right shoulder panel has a mild interference with the ejector track when it is propped up for service access.

21. Installed workstation:
- Is the Digicard still necessary? It was a little troublesome to configure the ports, and its use does not seem needed
- Had trouble installing print console. It had not been installed yet upon my departure from Sussex. It would be also useful to know; exactly when is a dongle needed?
- As print console had not yet been set up, there was no chance to set up the featureless edge detect option. There could be problems with plates coming skewed into the drum for this option. Although Mike found that the entire notch on the drum strap was absorbing the focus laser, there definitely were some "sweet spots" where more absorption was taking place.

22. Installed head onto zstage:

- There was no indication of how many shims to use on the rod. This information needs to be written down during disassembly and passed along
- There were no extra shims included for the 5th point
- There was a mild tilt seen after burning a test plot. Production seems to be under the impression that a tilt of 1/3 of a line is acceptable, which it is if the line is a one pixel line. The acceptable tilt for staccato to work is 1/3 of a pixel, not 1/3 of a 3 pixel line
- When installing the Head it was noticed that the cooling lines had too much slack which when installed produced a force perpendicular to the drum. The head is held down by four springs onto the zstage, but the force coming from the cooling lines seemed enough to ever so slightly move the head on the v-grooves. This could produce yaw and might be seen as banding in the image.
- The boot for where the cooling lines attach to the head, did not fit well and compounded the problem of having an extra force perpendicular to the drum.

23. Initialized machine, loaded some plates into bay #4 and attempted first pick:

- The first pick resulted in the slip sheet being blown to the back of the MCU
- The first pick also saw the left pcup come down before the right and made vacuum, but then the right was not able to come down anymore and was not able to make vacuum, resulting in a miss pick
- These two problems took considerable investigation time. As it was already 1am in the morning, I thought it best to get some rest and come back fresh in the morning.

Thursday June 30 2005:

24. Arrived onsite and began troubleshooting the previous nights problems:

- Checked the pressure in each pcup, but gauge was not adequate to see small differences
- Looked for any sort of mechanical interferences but found none
- Changed the picker motion count in service shell from 6 to 0 and separator on time from 2000ms to 0. This helped and the slip sheets were not being blown to the back of the MCU, but it is not really an adequate solution, just a temporary fix
- It would be useful to know the pressure coming out of the separator and angle of flow from one MCU to another.

25. Loaded the rest of the cassettes with the help of operators:

- Used the opportunity to give the operators some training in how to load cassettes
- Picked a plate from each bay and loaded onto drum, then unloaded each plate with no problems.

Items that need to be followed up on

Local service engineers need to do the following at the Sussex location:

1. Keep an eye on the left pcup coming down before the right, and even possibly add counter weights to avoid picking errors
2. Install boot for cooling hoses if possible or get approval to leave it off
3. Install MCU safety panel if not done so already
4. Replace the SSR front panel
5. Review changes made to separator time and picker motion count in service shell, keeping in mind that there were initial problems with the slipsheet being blown to the back of the MCU
6. Add UHMW tape to the ends of the cassette
7. Shim the hinge on the SSR rear door, to bring it into alignment
8. Report back to customer the wavelength of the laser TH2 & TH3.

All of Service:

1. Request troubleshooting and alignment documentation for Fetcher and Ejector
2. Review packaging of machine and placement of crates onsite
3. Address issue of garbage disposal
4. Review leveling procedure (actually the whole installation procedure)
5. Request a procedure for re-aligning the MAB's and under what circumstances would they need to do this
6. Request that a 18mm socket (MCU castor removal) be added to the tool kit, as well as safety pins for the jacking operation
7. Is the Digicard in the workstation still necessary?
8. Dongles: in what situation are they needed?

Shipping:

1. Do not remove both jacks on the SSR bin. Instead remove the front jack only
2. Discuss with Service possible better packaging that would facilitate a quicker installation.

Engineering:

1. Proper belt tension of all belts on the machine (will reduce machine noise)
2. The unload table left and right wide panels had an interference and needed to be reworked
3. The fit of the SSR front panel (is it a manufacturing error or a design error) either way this panel just doesn't fit well and never has, so time to fix it
4. Cassettes do not touch the plenum rollers
5. Cutouts in the cassette cart for the roller sensors need to be enlarged
6. Cassette cart drifting problem
7. Remove the jacking feature at the end of the Ejector
8. Better transition for all parts that the Ejector and Fetcher move over (this will reduce machine noise)
9. How to ensure plate exit panel is plum
10. Will separator work through various angles
11. How to make the cassette door not seem like a "finger guillotine".

Production:

1. Do not place foam blocks between loadtable front beam and unloadtable, find and alterative method for securing the unloadtable.

2. Test jack adaptors for fit in all jacking locations before shipping
3. MCU parts need to be checked against drawing for vendor mistakes
4. MCU plate exit panel needs to be installed plum
5. Review entire assembly process for MCU
6. Supply extra shims for zstage as well as a note of how many shims are needed
7. Ensure adequate engagement on the cassette cart dampener
8. Do not use bell washers on the drum motor cooling fan on the left side for large drums
9. Mark position of Ejector track before removal
10. Cable air panel should be tested to see if it can be removed easily
11. Confirm the correct placement of foam fireguard, and understand the reason for its being
12. Review procedure for installing the front shipping pins, that connect wireframe and engine
13. If pem nuts break during disassembly don't ignore this fact, pass the information along or have a procedure for dealing with it
14. Label the pull out table home lock "POTL HOME"
15. Panel alignment needs to be reviewed
16. Get the correct information on what is acceptable for tilt
17. Review the length of cooling hoses where they attach to the head