



## PRINT FOR PROFIT #25

### THE STENCIL: A SWEAR WORD

“Stencils,” said he; “War and Peace,” said I. “And we don’t want to have to put an expletive check on the copy,” was our esteemed editor’s retort.

Just to be clear at the start the stencil is the mesh stretched on a frame onto which is normally applied a photosensitive film into which the image is exposed and developed. We are thousands of years past the woven hair and cut leaves stuck to the woven hair mesh that was mounted on a wooden frame, but the same principles apply.

Remarkably, wooden frames are still occasionally used and the polymer mesh can be just as baggy as the hair of ancient times.

I suppose the simple indicator of competence in screen printing is whether the tension of the mesh is regularly measured. By regularly, I mean either before or after use. If tension is not a parameter that is of concern to you then neither is registration, ink deposit or edge definition. It is not just a matter of tension in the middle of the stencil but at defined points around it to ensure the tension is consistent.

The forces exerted on the mesh when stretched cause the individual threads to elongate. As long as this elongation is within the elastic range of the threads they will recover to their original length. The tension in the mesh is the hidden but stored energy of the screen printing process. Mesh tension affects the consistency of the printed ink film, edge definition of the image, image size and life of the stencil. One typical misconception is that high tension is always better. It is only better if, when working, the peak tensions generated do not exceed the elastic limit of the mesh.

Excessive snap distances can elevate the tension when closed by the squeegee such that it pops. Long before then the mesh would have gone into its plastic phase and the mesh lost its elasticity. In the US and occasionally in Europe exponents of self tensioning frames call this plastic phase “work hardening” and continue to increase tension even during production. This results in a mesh that is unstable and requires regular re-tensioning until it finally fails. Although some of the mesh manufacturers won’t condemn the practice they tolerate it because their mesh is sold even though the process destroys it. What you need is a robust frame that will resist the forces exerted by the tensioned mesh and the action of the squeegee.

#### THE FRAME

The simple rule is if you can easily see the bow on a frame it is probably shot and should be replaced. Frames don’t last forever and should not be treated as a capital item. Each time a frame is recovered with mesh some metal will be removed, this weakens the frame. Depending on how much metal is removed will determine the life of the frame. This assumes that it hasn’t been dropped on the corner with mesh stretched on it or the welds have split. For large users the concept of leasing frames has to be attractive. You then give your supplier the responsibility for keeping the inventory in good order. Whatever method you adopt, own or lease, you need to keep track of your frames so



that you know how many times they have been re-stretched and the condition of they mesh when they are in use.

## **THE MESH**

Having concluded that the integrity of the frame is paramount then is a mesh just a mesh? No it isn't! Good quality screen printing mesh is a superb example of precision engineering. If you have ever been fortunate to see a weaving shop and the subsequent processing tied in with rigid quality control you would blanche at the way some stencil makers and printers abuse it. Engineers weave, it others wreck it. Modern meshes are remarkably consistent; it is exceptional that we come across bad quality mesh. Incorrectly selected or mis-treated yes but mesh out of specification is very rare.

Meshes from different manufacturers that have the same dimensional specification will not necessarily have the same print characteristic. Even if the thread comes from the same supplier the mesh manufacturing process will alter the surface characteristic of the mesh and the geometry will be slightly different. This will mean that mesh specifications apparently the same from different mesh manufactures will provide a different lay down of ink. If you are doing four colour work and have produced calibrations for particular presses if you change mesh manufacturers you may have to re-calibrate the output devices for the photopositives or your direct to screen systems. It might seem picky but it is better to avoid a problem than have to cure it.

For particularly critical print work it is recommended that mesh from the same batch from a given manufacturer be used. Even for normal applications there should be traceability back to a particular bolt of material as each one may demonstrate different elongation characteristics that will determine the stretching regime. There is also the issue of mesh count before and after stretching. The mesh counts specified by the manufacturer will have a tolerance. This tolerance applies to un-stretched mesh. When it is stretched the mesh count will reduce maybe only by one or two threads per centimetre but this can have an effect on the generation of moiré as the ratio between the mesh count and line ruling will alter. For many applications this is irrelevant but where fine tones are being printed it is an issue to be considered.

People often ask what is all this talk about pre-treated mesh that I don't have to degrease? The process developed by the major manufacturers is designed to remove the lubricants required in the thread manufacturing and weaving process and modifying the surface to improve its wet ability. The effect is four fold (1) To reduce or remove the need to degrease the mesh before coating (2) Improve the flow of liquid emulsion into the mesh and better adhesion of capillary film. (3) Provide a more consistent ink flow and distribution throughout the image area. (4) It is also claimed that reclaiming the mesh is easier.

Although it can be slightly more expensive the advantages normally compensate for any cost penalties. It is likely that as more of this material is produced any cost penalties will disappear.



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Whilst on the subject of penalties, the burden of employer liability insurance is increasing apace. This is because of the compensation industry that our esteemed legal community is inflicting on us as employers. Tie this to escalating legislation and life is getting difficult for employers. Some do not help themselves, a glance at certain stencil reclamation areas will tell the sad truth. Partially deaf knights of the reclamation department wielding high pressure water lances creating chemically laden mists that they are inhaling with abandon. Ear protection no, goggles no, masks no, chemical proof clothing no, health and safety data sheets no, extraction – yes, but only at the dentist. Come on fellas, what's wrong with a T-shirt jeans and trainers? All that protection is for pansies; this is a man's job!

'Yes, your Honour, we told him to wear them, but he refused.'

What was stated in your Health and Safety policy? Who carried out the Risk Assessments? By now the mist you are seeing is a red one before your eyes. The potential fine is growing and the likelihood of you being able to renew your liability insurance shrinking. It is all well and good ranting about increasing regulation if at the same time you are happy aiming a twelve bore at your own foot. Pull the trigger on the shop floor you might be able to claim on the employee liability insurance if after the case you can get any.

This is a tongue in cheek depiction, but it is not too far from the truth. If you recognise any aspect of this in your organisation it is recommended that you extract a digit before you get shafted. (Look, Peter, I know you have strong opinions, but please voice them with more subtlety. Say, 'I suggest you apply best practice'. Ed)

Is it just us, or are things starting to pick up in the industry? Increasingly, I am hearing companies are very busy and there are purchases of capital equipment for screen printing being made and considered. There will still be casualties but those that remain will be weaned off the cowboy attitudes that pervaded the industry in the past. I see increasingly professional companies producing some wonderful work. Don't let the polish and pride stop at the reception and showroom.

If stencil reclamation looks the part so will the rest of the company, after all the mesh stretched on a frame is where screen printing starts.

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The tension in the mesh is the hidden but stored energy of the screen printing process.