ROLL AND WEB SCREEN PRINTING

It seems like I have been writing these articles since Noah's dad was a lad, in truth it is only since Ami Pro was a well known word processing package, probably ten years. By jove! Haven't things changed in that time? Back then the squeeze and squirt process was in its infancy and many companies were buying multicolour screen printing lines as their way forward. Of course there has been a revolution in digital technology but in the PoS industry at the superwide format end and in large flatbeds, this revolution is turning into more of a small disturbance, with some equipment even appearing on e-bay. Yes there is the onset of Onset but that will be for the deep pocketed few.

All the time whilst the sound and fury of the revolution has been deafening many to the continuing growth of screen printing onto substrates from roll to roll also known as web fed. Believe it or not probably the largest screen printing company in the world in terms of sales dependent on the screen printing process is in Scotland. They use both flat bed and web fed machines to produce their products. For those who are unfortunate enough to have Diabetes the instrument they use to measure the glucose level in their blood has a sensor that is in fact a small electronic circuit onto which they place a spot of blood to take the measurement. Diabetes is a rapidly accelerating condition driven by our modern lifestyles. In America 7% of the population have it in the UK we are rapidly catching them up. World wide there are 140 million people with diabetes. Not every one of these use electronic devices to measure their blood condition but an increasing number does. That is an awful lot of biosensors that require screen printing. When volumes justify it web fed screen printing is a highly cost effective solution.

Screen printing on the web is not a new process it has been available for many years in label printing when it is combined with other printing processes and finishing operations to provide pretty complex multifunctional labels. Printing on the web can use flat bed screen printing, cylindrical screen printing and rotational screen printing. The aim is to lay the ink down onto a flexible substrate in as controlled a manner as is necessary. The limiting factor with regard to substrate is its flexibility and the limiting factor with regard to print speed is nearly always the ability of the system to dry the ink sufficiently for the next operation.

The big advantage of web fed printing systems is the capability to build into the line a series of different processes and to end up with a finished product. Doing this can be very challenging because it is necessary to balance all the different techniques so that one of them does not become the weak line in the chain.

The ink systems that can be printed on these lines is as varied as a conventional screen printing press but the challenges for the machine supplier can be much greater. If the ink is UV Curing the issues are relatively straight forward because the curing takes place very quickly and the curing unit is relatively small. When you consider using an ink system that is dried and cured radiant heat, conduction and or hot air the degree of difficulty can increase dramatically. On a conventional screen printing line that dries solvent based ink systems the dryer has to be several metres long and then it is often necessary to cool the substrate to stabilise in. If you were to have a multi-station web fed screen printing line the length would be prohibitive. Therefore the machine supplier has to be ingenious in how they deal with the drying element of the process.

The substrates that can be printed range from paper to polyester with a whole variety of materials in between. Clearly they must be available on the roll and have a level of stability that will enable registration to be accurate when printing several passes. The tension of the web is very important to registration as is stopping the web in the right point in the print cycle. Some systems run continuously and the web is printed on the move. To do this synchronisation of the print stoke to the moving web is even more important. Some of the films to be printed are only a hundred or so microns thick so handling this delicate film is a science in itself.

One of the masters of the science is Richard Rolt who runs Rolt the innovative machine builder in Bishops Frome, Worcestershire. Richard has a very busy production schedule sadly all of it going to manufacturers overseas. If only the rest of manufacturing in this country was so buoyant. That may just be a dream but Richard has shown that determination and innovation will succeed. Rolt look particularly at special applications where the need is to automate a printing process and save money. Surprisingly in the time of recession the Rolt equipment becomes even more attractive with its competitive prices and imaginative solutions.

Normally web fed or roll to roll screen printing is really only viable for long runs but Rolt supply a machine to a manufacturer who will print as few as twelve four colour labels. The trick here is to make changing the stencils as quick and easy as possible. Normally web widths do not exceed 500mm and the common width is 350 mm.

OUTPUT FROM A ROLT

Richard sells his equipment worldwide and a recent application is producing textile transfers printed on paper and 70 micron polyester. The key to this equipment is its simplicity to install, operate and maintain. When you are small specialist company you cannot have engineers dashing all over the world explaining to customers that you have

to press the “Go” switch to make it print. Thermal transfers are particularly demanding to produce as there can be many colours in one design as well as the adhesive, the release layer and protective lacquer. Because of this variety of ink films the drying has to be very carefully controlled, the substrate has to be stabilised throughout the process and unless you build a crunchingly expensive 12 colour machine the printer will often have to feed printed substrate back through a four colour line more than once. To do this the registration and handling systems have to be bomb proof. Rolt use flat bed print stations and index the substrate through the machine.

ROLT SNAIL LINE

A typical innovative solution where space was an issue was the Rolt “Snail Line” Here the dryer was formed into a square and the take off was place in the centre of the square. In so doing this reduced the length and height of the line substantially.

Werner Kammann have a different approach to roll to roll printing their KS61 OS is modular standard machine that can be adapted print a whole range of specialist applications.

KAMMANN K610S

Unlike the Rolt machine with the K61OS each print station uses a cylindrical printing action with a flat stencil. This means that the web keeps moving. Brian Laming the Kammann Print Specialist in the UK says that this system enables very close registration tolerances. He also emphasised the very sophisticated drying techniques used on the machine. The effect of these systems is that the machine can print the increasingly complex materials used in electroluminescent applications, RFID and other consumer electronics. The handling systems enable substrates below 12 micron to be printed. The K610S will also support offset litho and flexographic print stations. As with the Rolt equipment many other functions can be incorporated but this level of complexity comes at a price. Value for money the Kammann certainly is but it will be a major investment for those who wish to benefit from the technology.

Almost all of this technology is going to the Far East and other foreign shores. That is an indication of the destruction of UK and European manufacturing. We have the engineers, the ideas and the development skills but the equipment is driven to where there is cheap labour and low overheads. For those among us who were brought up in an era of home based manufacturing, shipbuilding, a Major UK electronics industry, textile production etc etc the current decline is near criminal, don't worry we will soon be a low wage economy servicing historical theme parks, unless we get a grip and quickly.