

What is the topic for this month Jon? Was the question I posed to our esteemed Managing Editor Jon Barrett. Jon is the gentleman to whom you address your complementary comments about this column. Any adverse remarks can be sent to my ex mother in law who will pass them on to me with a flourish along with additional abuse. After some careful contemplation Jon suggested: A SWOT Analysis of Screen Printing. To those who only know of swot as sudden death for flies, SWOT stands for Strengths, Weaknesses, Opportunities and Threats.

A SWOT Analysis is normally used for organisations but it can also be applied to a process, particularly one in a state of transition as is the case with screen printing. Ideally you should gather individuals together to provide different perspectives to be objective. An accountant, an engineer, a sales person and an administrator would provide a range of thinking strategies that would expose all the various aspects of an organisation. In this case you will have to tolerate my multi-faceted approach. For the analysis to be relevant it must have an objective. In this case the long term objective will be:

Develop strategies to increase the penetration of the screen printing process into a fragmented market.

### **STRENGTHS**

#### **AN INK/MEDIUM FRIENDLY PROCESS**

Any material that can be dispersed in a fluid, whose viscosity can be suitably adjusted, with a particulate size that it will pass through a mesh, can be screen printed. This can range from concrete to melted chocolate.

#### **A THICK FILM PROCESS**

The thickness of the wet ink film can be as great as 300 microns, 0.300 mm

#### **A MASS IMAGING TECHNOLOGY**

The ability to print multiple images on large areas of substrate.

#### **A CONTROLLABLE, MEASURABLE, AND PREDICTABLE PRINTING PROCESS**

Contrary to many traditionalists the screen printing process CAN be treated as an engineering process. It is users who sometimes add an unacceptable level uncertainty by adopting unsound practices as the norm.

#### **MULTI-SUBSTRATE PROCESS**

If a substrate is wettable by the ink and the stencil can maintain contact with the substrate it can be printed.

#### **STATIONARY OR MOVING SUBSTRATES**

It is possible to print on a stationary sheet, a moving sheet, a stationary web or a moving web.

### OBJECT PRINTING

Flat, cylindrical and curved objects can be printed.

### ROBUST PRINTING PROCESS

The printing mechanism is relatively simple and relies on stable mechanical and physical parameters.

### PROVEN TECHNOLOGICAL BASE

Implemented as a “modern” production process since early 20<sup>th</sup> Century. It has been in existence for more than 2000 years.

### ADOPTS DIGITAL TECHNOLOGY TO ENHANCE PERFORMANCE

Direct to screen imaging, digital control of machines and digital process measurement have been taken up.

### LOW COST START UP

It costs only a few pounds to start up in the process and very little more to prove the practicality of the process for a particular application.

### COST EFFECTIVE INKS

Don't be held ransom to stingingly expensive single source ink supplies. Screen inks are suitable for all types of machine

### SPEED

A relatively high speed process for creating multiple images on a substrate.

### IMAGE CARRIER (STENCIL)

The stencil can be recycled and used many times for different images unlike most other analogue processes where once the image is on the image carrier it cannot be changed.

### IMAGE CARRIER

Can be flat or cylindrical. Cylindrical allows very high speed printing on the web.

### MULTI-PASS PROCESS

It is easy to apply several layers of medium (ink) on a substrate using different curing regimes. UV, Thermal, Evaporation, Baking, Forced air, Heated blanket, Microwave etc.

### MANUFACTURING

Can be used as part of a manufacturing process in line or off-line

### PROFITABLE

Recent surveys have shown it to be a great profit generator.

### HIERARCHICAL

Higher skills mean higher profits

## **WEAKNESSES**

### AN ANALOGUE PROCESS

As yet it is not possible to alter the image on the stencil during a print run

### SEEN AS AN OUTDATED PROCESS

It has been bombarded by spin from digital equipment suppliers

### CONSIDERED A DIRTY PROCESS

Bad practice in the past has created this image

### AN IMPACT PRINTING PROCESS

The stencil has to make contact with the substrate that disqualifies a few applications

### UNCONTROLLABLE

An opinion of the ignorant

### STENCILS DIFFICULT TO RECLAIM

Using manual reclamation can be challenging With automation not the case. Not necessary to reclaim all the time.

### SLOW

When compared to offset litho. Not compared to digital printing.

### LARGE DOTS

Not when viewed from the correct distance

### WON'T PRINT FINE LINES

Only if 20 microns isn't fine enough

### DIFFICULT TO OPERATE

If it is allowed to be

### NOT FASHIONABLE

Remember the miniskirt from Roman times, the 1960's and 2007

## **OPPORTUNITIES**

### STREAMLINE THE PROCESS

Cast out all "spanish practices"

### PROMOTE THE PROCESS

Talk about its advantages not its shortcomings

### IMPROVED IMAGE QUALITY

No banding on the print. More vibrant colour than any other printing process



### FIT FOR PURPOSE

Light stable pigments. Excellent adhesion to a multitude of surfaces. Abrasion and chemical resistance

### SPECIAL EFFECTS

Used alone or in combination with other processes it can create from mirror effects to abrasive coatings.

### ENGINEERED LAYERS

Controlled thicknesses of inks and mediums laid down in accurately defined patterns. Applications that require clear edge definition controlled thickness and excellent intercoat adhesion

### WHY WAIT

If you can screen print it, do it now. Don't just wait and hope it can be digitally printed some time in the future

### KNOWN PROVEN TECHNOLOGY

No surprises when you use screen printing, it does what it says on the tin

### THREATS

#### APATHY

Who cares!

#### FEAR

Fear of being left behind in the digital rat race

#### IGNORANCE

If nobody speaks out about the qualities of screen printing no one will know about them

#### DISINFORMATION

If enough people with an agenda say that the process is dead eventually others will believe it.

#### HIGH SPEED DIGITAL PRINTERS

Print rates of 500 square metres per hour will eat into the POS screen printing market. Only a few will afford the £1.5 million price tag. How much will the inks cost?

#### PREJUDICE

End users have stated: " We don't want screen printing." But they do not know what it has to offer

#### THE PAST

Big profits not linked to improved practices degraded the process.

In simple terms this SWOT analysis shows an overriding positive answer with twenty seven Strengths and Opportunities and eighteen Weaknesses and Threats. One would be naïve to think it was that simple. What is clear, from the Industry Survey being carried out by the DSPA along with the inflow of information to technical journals, is that suppliers and printers should be shouting from the rooftops about the vast range of opportunities presented by the screen printing process.

A recent application brought to my notice is where flexible solar cells are printed using the Stork RSI rotary screen printer. VHF Technologies of Switzerland developed a means of applying very thin layers of amorphous silicon on to plastic substrates, using Very-High-Frequency plasma technology.

The rotary screen process is an important step. A grid of silver paste is needed to enhance the conductivity of the panel, which is able to deliver about 7 W power in an area of 0.2m<sup>2</sup> in normal light conditions. The Stork printing module was chosen because it could clearly deliver the necessary seamless quality, and it had the potential for high productivity.

SOLAR PANELS PRINTED  
ON A STORK RSI



Rotary screen printing was the clear choice because it ensures consistent quality of reproduction. The Swiss team faced many challenges to achieve a properly functioning solar panel. The silver lines had to be 50 µm wide by 20 µm thick - Stork Prints technical team worked closely with the company. They advised on the design and installation of drying and curing equipment and worked jointly on finding ways to achieve optimum productivity without compromising the performance of the materials and substrate. The challenge was to enable the ink to achieve conductivity of 25 Ω / square / mil., without reaching the substrate's melting point and thus damaging the substrate.

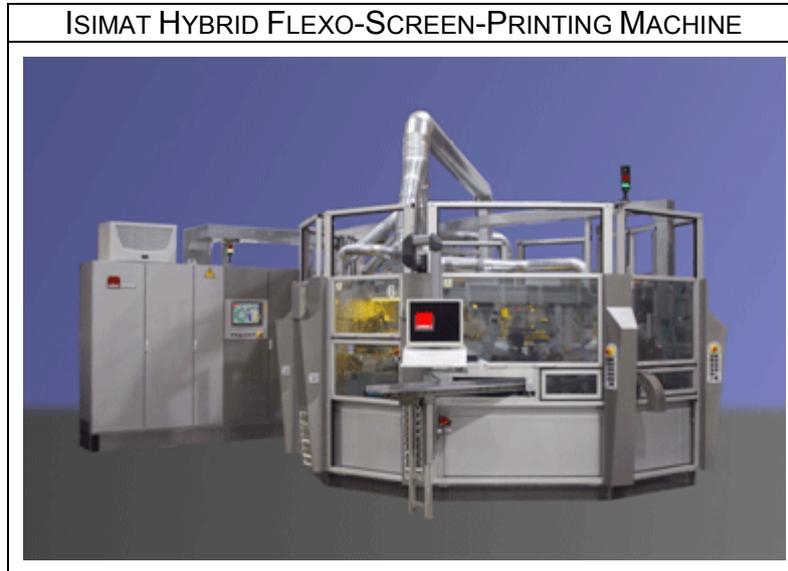
The resulting solar cell filmic panels can be walked on and rolled up when not required, making them ideal for energy saving situations wherever space is a premium, such roll able battery chargers for camping, caravanning and yachting.

With their ultra light-weight and weather ability, Flexcell cells are suited to one application area where the heavy panels could not go: structures. A PET membrane can cover complete building tops – especially flat industrial roofing - without overexposing the structure to pressure. Such a feature offers building owners the opportunity to reduce energy costs, or even 'harvest' energy for forward selling, to the electricity grid or the end-users directly. Without screen printing this world beating development would not have been possible.

Another example of the flexibility of the screen printing process is where Isimat of Ellwangen in Germany have produced a Hybrid Flexo-Screen-Printing Machine that offers production flexibility when printing using servo-based screen printing machines with multiple servo-axes in each printing station. It can print onto sophisticated shapes



that have round, oval and linear elements; for example printing a wrap around onto a square plastic container that has round corners.



Integrating different decoration methods, such as varnishing or hot foil stamping, into an automatic multi-colour screen printing machine gives decorators new and very cost efficient options, because integration eliminates the need for intermediate product handling. Flexo printing can also be built into these systems. Path 2 Print Limited in Sheffield is their agent in the UK and Harald Gavin will be delighted to tell you more about the systems.

It is applications such as these that expand the applications for screen printing and demonstrate its synergy with other processes. There is a bright future with screen printing for those who are willing to open their eyes.