

What Tech Books Don't Teach Screen Printing Companies— Hidden Secrets of Achieving Excellence at No Additional Cost

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by Mike Young – Imagetek Consulting International

Commercial Considerations

As a reproductive imaging process and despite its insignificance when compared to the allied printing industries, screen printing stands head and shoulders above the rest because of its immense uniqueness and creativity. It can handle an enormous amount of different substrates, shapes and sizes, gives much impact in appeal, greatness in vibrant colours and saturation levels, enhances brilliancy and adds unbelievable aesthetics to any job that other process can only dream about. Furthermore, screening is a low investment process in comparison, yields quicker return (financially) and relatively easy to produce dramatic results but the real attractiveness and advantages are its unlimited ways any job can be innovatively completed. However, as easy as it is to achieve unparallel quality, it is just as easy to arrive at failure.

Just because screen printing may *look* easy, too many companies believe it is easy to do successfully and profitably. Not so! Like most things in the real world, it takes a lot of planned effort, hard work and smart thinking to make anything look easy and to succeed spectacularly. It is only through smart planning and developing the precise balance between skills and processing techniques that will ensure success is that much easier to reach.

This article is about how to achieve excellence in screen print with emphasis at no additional cost. If anything, it may reduce cost in the making in many situations. It addresses this objective in two parts; commercial (business) and technical (printing) considerations. These two important aspects will be discussed to enable an operation to provide screen print constantly at a high standard. They reveal strategies and ideas that textbooks never seem to cover—with the aim of steering any discriminating screen printer onto the right road to excellence. This month's edition starts with some of the most significant commercial considerations to point the business *mindset* and attitude in the right direction. Only later can technical considerations be reviewed, which highlights production issues and targets those specific areas that affect quality printing the most. The rest is then up to you.

A curious question often asked by existing and new start-up companies is whether they can screen print truly to an excellence “standard”—whatever that may mean or represent. Although standards have never been universally defined within our industry, it is safe to say with a resounding *yes* that achieving excellence in print performance is within easy reach of everyone—regardless of product, situation or location. Reaching out to obtain higher levels of print quality and maintaining them means a commitment by owners and management must be invested of not less than 100% in every department, process and production steps involved. Other than the necessary desire and an entrepreneurial spirit to turn excellence into a reality, the initial mechanism to achieving the objective appears to be more by how a business designs and engineers its printing operation, from an ideological position, rather than simply attempting to beat the competitor on the other side of the city or over the border.

The mentality of operating a screen printing business below the level of the markets and specializations served will seldom return admirable profitability let alone permitting growth. At every level, customers are becoming more demanding with their purchasing power by insisting on greater quality, faster service and lower prices. On the other hand, using top-of-the-line equipment, printing with only the finest materials and employing outstanding skills will never provide excellence by themselves. In order to provide excellence, the mindset behind the business must first be concerned with its commercial attitude as well as technical aspects. It matters little what level of market a company serves, from mass-produced, cheap, inexpensive single-colour stickers, signage, giftware/souvenirs, posters, fleet markings/decals to the extremes of printed circuits, high-end exquisite 4-colour in-store media, touch screens, keypads, graphic overlays or membrane switches. If one wants to survive, stay competitive and make a good living at it, then the printing operation must be designed and engineered by management from the very first day to meet their clients' objectives and more. This way of thinking is the only foundation that can support the road to print excellence and at no additional cost for doing so.

Before we go any further, it might be a good idea to understand what is meant by print “excellence” as it relates to this article. Reaching *excellence* could be inferred to any company that prints to and beyond customers' expectations, at competitive prices yet maintained projected profit in doing so. “Quality expectations”, “competitive pricing” and “retained profitability” are the only three all-important business factors that matter in the world of successful screen printing. It has nothing to do with print size or quantity, the degree of ease-to-difficulty or customer size or importance. As to the question of handling detestable jobs for the latter, how many times have you heard “we lost money on that job but it was for a big important customer”? No wonder they are big and living on your money while you are struggling to survive! Summarizing these three all-important factors together another way:

- a) shipping quality must at least meet customers' complete needs (to build loyalty and repeat business),
- b) print jobs produced in the most cost-effective manner (within agreed estimates)
- c) be profitable (not so much to satisfy owners' egos but to stay in business and prosper).

If just one of the above business factors returned a negative result, continuance will eventually put any screen printing operation out of business. The purpose of this article is to improve the situation without additional cost to provide “quality” but not at the expense of “profit” and to reduce “production cost” by working smarter—not harder than the competition! By keeping a close watch on these all-important factors, one can then take their printing operation to another plateau in performance; more cost-effective and to remain a serious contender and competitive yet still be very profitable.

As stated, it is only through careful attention to each step of the process that enables one to establish the right level of environment for the quality being sought. When this task has been carried out carefully with complete diligence, quality and cost-effectiveness through greater efficiency could well compare or even better one's adversaries. One thing that can be assured in the business of screen printing—no one is going to think abstractly or practically on your behalf in this respect. Owners and management can only do this themselves by systematically evaluating practical ideas, select and engineer the appropriate means of implementation and develop the necessary skills for complete process compatibility.

As mentioned, no one is going to research the process to higher quality performance for you and like most things in a real world, it will not come easy at first and hard to accept initially. The good news, however, is that achieving print excellence can be easily reached by everyone—but only if one “*plans their work and work their plans.*” This is perhaps the only way whereby a known set ‘standard’ can become a common everyday in-house practice, routinely convenient and subsequently profitable by control for the company. The real qualifier here is “routine”. Take your average customer for example requiring a product with a specified degree of print quality, be it with a spot-on colour-match, accuracy or a certain appearance. The required ‘standard’ of that finished print ought to be made available without any thoughts to obtaining that level of quality, as one would expect when buying a Ford or Toyota car from an automotive dealer anywhere, or as conveniently as purchasing a Seiko watch or a software programme from Microsoft. Let me briefly share what happened on a trip to China once to see exactly what I mean.

Not really a lover of fast food I, nevertheless, had a hamburger at McDonalds at the corner of Tiananmen Square, Beijing. For a moment or two my thoughts were I could just as easily be eating the burger at McDonalds in New York City, London or Mexico City! The Big Mac tasted just like the one back home. Even the coke tasted exactly the same—I could not tell the difference. Why? The reason is that both companies (McDonalds and Coca Cola) had ‘engineered’ their products to get the same quality, feel, look, smell and even the same taste of what one expects—regardless of where in the world it was produced, sold or consumed! Obviously, achieving this ‘standard’ mattered little that it actually took place in China, a country politically and ethnically so diversified with many different social and cultural behaviours, habits and ideological ways. Interestingly, less of a concern to the Chinese is their per capita is one of the lowest in the world. But as far as producing world-class products, they succeeded in excellence and did it very well!

Therefore, my question to everyone seeking higher quality and lower cost as a standard entity is, “How did the Chinese accomplished this feat with inexpensive food and drink so successfully?” I suggest the answer is simple, both products, including McDonalds familiar restaurant interior design (directly appeals to the customer sense of quality) and the coca cola’s distinctive bottle looks and logo (familiarity even in a different language), were engineered specifically to be that way. In a sense, they invested heavily to produce inexpensive quality products then rely on repeat business for their profits.

Screen printing should be no different. Excellence in printing performance does not have an ethnic label, racial ideas, political persuasion or even countries where it can only come from certain ones. Ideally, the printing operation only needs to

manage certain controllable standards to meet their respective markets whereby the end results can be acceptable universally *anywhere*. And ‘anywhere’ is the key word in this respect. Will the finished print be acceptable in the same market elsewhere in the world without relating to explanations by where it was printed or country of origin. Is it possible to provide that same level of quality and still be very profitable? As the printer, the answer is entirely up to you and not the customer.

This article is not so much about how screen printers can compete with their adversaries in Europe or other parts of the world. It is more about down-to-earth ideas on how to improve upon existing levels of quality production in the current workplace and maintaining them. Competing for high quality screen printing is simply not a question of equalling competitors but rather employing techniques to better them without having to pay extra for the efforts! This is not a formidable task as most printers think providing they understand and accept tangible means to plan the printing operation reasonably well in the first place. Mostly, appreciation of aspiration to achieve quality performance already exists in many facets of the commercial and industrial markets today. Just look around India for a moment, particularly Mumbai and Maharashtra, where world quality excellence already exists with goods manufactured in abundance for both domestic and export markets.

Profitability

First and foremost, making a “profit” should not be considered a dishonest action but something that is fundamentally required by every company in the world doing business, regardless of its nature, in order to survive. While the opposite creates long lasting damaging consequences, profit building is pure, honourable, righteous, noble and extremely praiseworthy to achieve. It is also very good for one’s health!

Although the question of successful profitability comes at the completion of any job printed, we shall start off with this very important part of business because there is no point in screen printing if one cannot make a living from it. From a commercial point of view, it should be understood that to make a product ‘higher’ in quality than from its standard form, or become more cost-effective, it should still return a respectable profit for the maker. If profitability cannot be achieved and maintained, it becomes all too easy to devalue newly acquired skills and techniques in false hopes that it will eventually uplift profits that are missing. This is the very reason why the aircraft engine division of Rolls Royce went bankrupt in the 70s as well as many other Fortune 500 companies that followed! On the contrary, it was neither products nor quality that failed but inadequate mindset. So, how does one retain respectable profit margins (or enrich upon those that are low) while at the same time improve upon the overall level of excellence?

There are two ways to make more money legitimately in business today—either take on more work or make existing work more profitable. Taking on extra work is obviously one way to make more money—but only if it is profitable. Unfortunately, a known fact is when companies create room to take on more work, it is chiefly at the expense of existing work—meaning it will be done but less profitable. This is precisely what happens when a company takes on more work than they can readily handle in hopes it will eventually lead to greater profits. We have all heard about companies who are extremely busy but at the end of the year they made no money!

Now, suppose there is no more work available in your particular line of business, either locality or within the marketplace served—what then? Develop a new market may

not be wise or practical, especially if new business is required immediately. What about the other option of making the existing operation more *profitable*? Let's take a closer look at this particular option since this is what the article is all about—providing excellence at no additional cost.

If an internal audit were conducted around the workplace, it may find through waste and gross inefficiency that the printing operation could be throwing away 25 paise or more on every rupee earned! This is an additional and unnecessary burden on top of any variation to the projected operating cost. Since a printer usually cannot charge customers more than the originally agreed price to complete the quoted job, cost overruns are directly taken from planned profits and beyond. As such, management should really consider this 'auditing' exercise better as a waste finding-audit rather than simply a cost-cutting exercise.

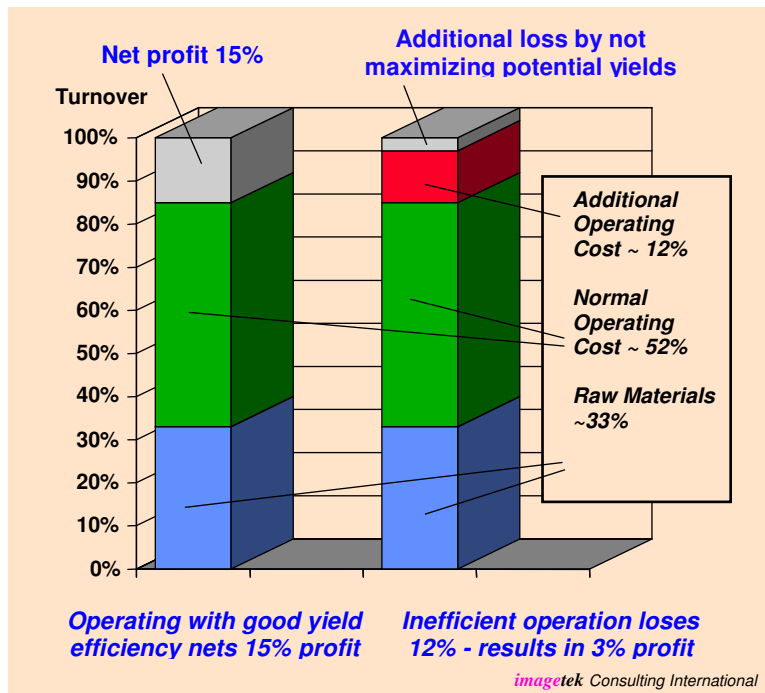
A simplified Overview Ratio of Operating Profit vs. Cost is shown in Chart A. It depicts a small to medium size trade screen printing company seeking to return a net profit of 15%, as shown in the left column, that sells through distributors (no sales or marketing cost to consider). Cost of materials and labour (including overheads) can vary of course, but both should not be higher than 85% of net invoice price. Due to gross inefficiency, an internal audit reveals a 12% "waste-cost" factor, as shown in the right column. In this scenario, the inefficient operation potentially reduces the same gross turnover to a mere 3% of planned profit! Amazing? This situation is obviously no good at all, not so much that it is bad for business, but because it simply will not allow one to concentrate on the right sort of energy to improve overall business and growth.

Conducting an audit to see how much it actually costs to produce waste and rejects, through inefficiency, as well as those

Chart A

OVERVIEW RATIO OF OPERATING PROFIT vs. COST

An example of a small to medium size screen printing company with a serious "yield" quality problem



associated in other areas of the company's operation, is an easy job to execute. It is a terrible mistake, however, to think that simply throwing away 10 misprinted sheets out of a 100 represents only 10 of cost. Nothing can be further from the truth. Areas to consider and thoroughly examine to establish real cost of negative burdens (losses) in the workplace may include and not limited to:

- Materials or substrates cost, labour, time, effort invested in rejects, rework and waste, particularly when several colours have overtime required and additional cost of materials to make up any shortfall if expensive or not economically easily replaceable in smaller quantities
- cost to slow down production to better handle potential problems, such as checking through each print for unacceptable errors
- consideration if the customer demands to pay less for the job than agreed upon if unable to deliver correct quantity or specified quality
- potential 'repercussion expense' if such scenarios internally affect other unrelated work in progress, or those about to be produced, due to operational disruptions
- delays and possible overtime to complete internal cost to make-up the differences lost in production time and rescheduling other jobs that needs to be pushed back
- consider already been printed and almost finished
- potential risk of losing repeat business or other work as a direct result of 'poor performance' shown

According to a proper audit, those 10 sheets rejected out of a 100 printed could well increase original operating cost by as much as 25% or more for that job. Continuously working in this manner could eventually equate to at least 12% of profit, which is taken directly from your bottom-line—not the customers'! This is obvious very damaging, particularly when 15% clear profit for businesses in Europe or North America is considered very good. To make up for this profit shortfall, perhaps an additional 40-50% problem-free extra profitable business might be needed just to be where one's profit should have been in the first place!

Loss vs. Gain

Before excellence can begin, managers and owners alike should realize that a loss from an operation is somewhat more important to prevent (and hence control) than plotting strategies for bigger profits—since losing is much easier to do. While projected profit is usually predetermined up-front during the estimating process before the job begins, making a loss from it is absolutely unlimited! This being so, it could be argued that one ought to concentrate on how best to prevent a *loss-making* operation from losing money first.

The mechanism that creates a loss is a factor that requires greater effort on behalf of management; to get under full control before any profit strategy implementation can hope to begin. It is a fact of life that "loss" will always be greater than the "gain." Chart B, (Geometry of Production Efficiency vs. Profit/Loss Ratio) in the following two pages, illustrates the rationale behind this contention clearly together with the

sidebar explanation (Appendix A). Despite its long title, it is a simplification overview of a screen printing operation's profit and loss that incorporated the business of sales and manufacturing.

The reason this point is demonstrated is to overwhelmingly show how important it is to *engineer* quality performance and maintain it throughout all processing steps, so losses can be totally eliminated entirely while providing excellence.

that job must be used. Cheating on a job, at any stage, invariably means cheating on your bottom-line profit. It just simply does not pay where profitability is concerned!

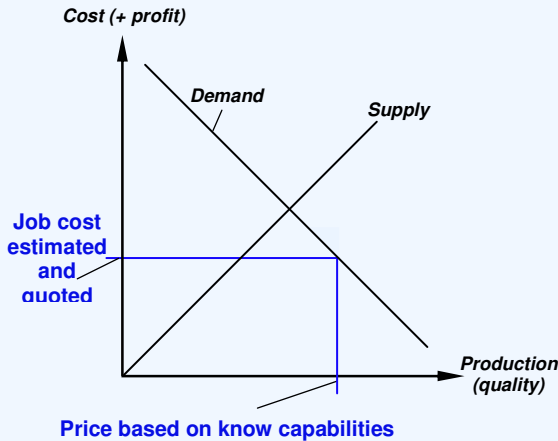
Suitable Tools

It has often been said “to make a product cheaply—you need expensive tools.” For a moment, please read that statement again, “to make a product cheaply—you need expensive tools”

GEOMETRY OF PRODUCTION EFFICIENCY vs. PROFIT / LOSS RATIO

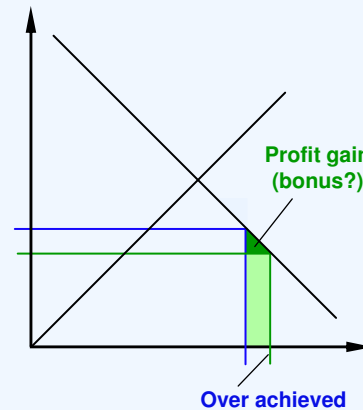
Chart B

a) Overview of quoting a job against production



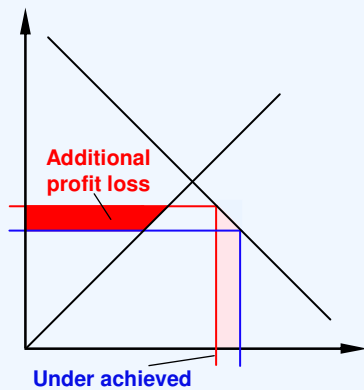
Cost a print job is based on previous experience and ability to provide according known production capabilities and skills

b) Overview of an efficient printing operation



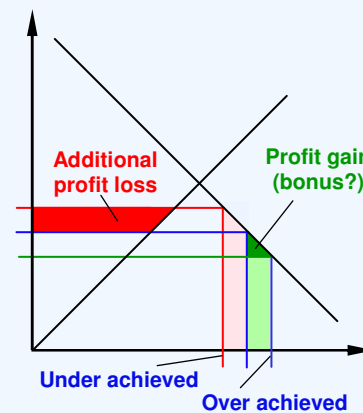
If the job was completed efficiently, in time, minimum waste and well within estimate, profit will protected and possibility earning a small bonus.

c) Overview of an inefficient printing operation



If the job took a longer, more overtime, much waste and high cost for replacements, all those “extras” that was not originally estimated will eat into profit.

d) Overview profile combing both profit & loss



It can be seen that making ‘extra’ profits is hard but making a big losses is very easy!

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One way to keep on the good side of any job *estimate* is to ensure proper quality ‘tools’ are used in the first instance rather than trying to cut corners by making do with second best. It matters little whether the job is of low, medium or high quality, appropriate tools (materials, equipment and processing steps) for

Keep reading it until every word of that statement is fully understood. Then look back at what I shared with you about my experience in China with McDonalds and Coca Cola products. Those two cheaply made products are merely typical examples we bump into each day without realising it. We take them for

granted and never give a thought about their qualities. This should also be true about qualities with screen printing any product—there—there ought not to be any exceptions, particularly when seeking excellence at no further cost.

To provide a print at the lowest possible price you need to have good processes in place, use the most suitable equipment and materials as quoted for the job and employ the right type of

techniques. No one is suggesting you go out and buy top-of-the-line pre-press and printing equipment or expensive materials, but making do with mediocrity against the level of work undertaken will never be a substitute to lower production cost to reach excellence. As far as providing quality service is concerned, very rarely will cheap or lesser equipment be a substitute to lower production cost to reach excellence or consumables to yield a good return on investment.

Chart B — Geometry of Production Efficiency vs. Profit / Loss Ratio

a) The foundation of this chart uses the primary tools of conducting a business in an ordinary every day manufacturing environment. It starts with the basic “production” and “cost” lines, respectively incorporating a predetermined quality level of production efficiency based on known experience against desired profit margin. Both are ultimately governed by what the customer is prepared to pay according to product’s requirements and its value thereof. These lines are then connected by a diagonal “demand” line since the customer wants something that production can make and deliver for a price—the fundamentals of “buy & sell” agreement in any business situation.

Once a customer’s purchase order has been accepted, it provides the “supply” line, as production cost must be within job estimate if one wants to stay around in business. In some business circles, the supply line is alternatively called a “product-value” line according to varying cost and quantity. As such, if the supply line were more upright, it would represent a high-cost product manufactured in low quantities. Likewise, a more horizontal line would translate into a mass produced low-cost product. Finally, the blue right-angled line shows quoted price level, as agreed in this example, according to job specifications based on the printing company’s estimate to supply the end printed product at a stated quality level as well as other requirements.

b) Suppose the job went well, less labour and materials used and delivered in a timely manner to the customer. In that case, the green right-angled line shows the job was completed well within projected estimates, thus equally reflecting a lower cost to produce by the time it is delivered to the customer. As a result, ‘extra profit’ could be generated (highlighted in dark green), although it may not be seen until accounts have been updated. This delightful outcome could then be considered as an incentive or bonus, if you will, of doing the job properly and efficiently in the first place. This is not unlike site workers and contractors receiving a “performance bonus,” when building or roadway construction is completed before estimated time, so cranes, machinery and workforce are released to other sites earlier than planned.

c) On the other hand, suppose the job did not go well due to carelessness, waste, costly rejects and overtime for one reason or another. In this instance, production [quality] did not meet performance according to expectations. To complete the job, it must correspondingly cost more to produce. The red right-angled line shows efficiency in production did not meet expectations and when delivered

to the customer the additional burden for poor performance (cost) can only be taken from projected profit for the whole job and perhaps more, as shown in red.

d) And that is precisely the problem. The magnitude of “loss” shown here is much greater than that of “gain” yet the over-achieved performance area linearly corresponds proportionally with that of under-achieved but the net result is completely different. This clearly illustrates a “loss” is always greater than the “gain”. All too often unfortunately, this fact is not known until it’s too late and accountants want to know how and why it happened!

There is another way of looking at this in a more practical way. Scholars in business economics have been saying for years that “waste” on average in manufacturing cost companies a factor of 2.8. In other words, it could cost nearly three times the original price to make up shortfall. One only has to look back under the earlier heading of “Profitability” to see the burdens and ensuing circumstances of an inefficient operation that has to be compensated to understand where the high factor comes from.

What this means in hard currency is to consider an operation that is designed and engineered to produce 100 pens per day (as everybody uses pens) that actually cost the company 10 rupees each to make. The pens are then sold through a distributor at a price of Rs.11.50/- each, thereby reflecting a manufacturing profit margin of 15%. This is good business because the factory does nothing other than make the pens while its distributors’ job to sell them into the marketplace.

Now the question is if only 90 pens were produced yesterday and 110 made today, did the factory meet its obligation? In terms of quantity, it did over the two day—but in terms of production cost, the answer is no! Those scholars reliably inform us that the extra 10 pens produced today did not cost the normal 10 rupees but Rs.28/- each. Now see what happens.

The factory correctly invoiced Rs.1,035/- for yesterday’s 90-batch delivery and Rs.1,265/- for today’s 110-batch. However, today’s batch did not cost Rs.1,100/- to make, as it should have done, but more like Rs.1,380/- actually! That is because the balance of the extra ten pens would have had the assumed manufacturing cost of Rs.28/- each. It doesn’t take rocket science to see this is no way to conduct business but such scenarios happen unfortunately everyday, in every city in the world of screen printing. Welcome to the real world! But it doesn’t have to be this way.

It is assumed the typical laws applied to most businesses simply will not permit improvements to be made, commercially or otherwise, using ill-suited machinery, ingredients or processes.

Screen printing is no different. If a company seriously wants to improve the performance of their own services—look no further than the performance level of the supplies and suppliers currently being used. If you think there is room for them to improve their own products, price, service and support then something need to do about the situation quickly. Low-level equipment or consumable cheapness is fitting only for cheapness in service and quality—never the other way around. In this respect, I once heard you cannot make chicken soup from chicken manure! Despite the humour, it is very true.

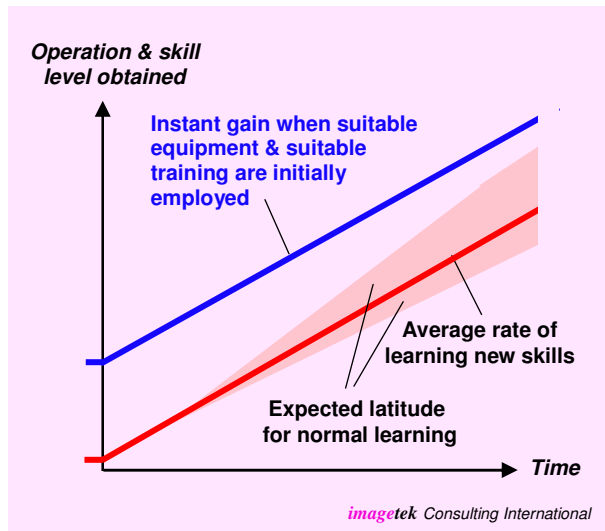
Learning Curve

“Is it possible to provide truly an excellence standard in screen print, particularly when starting out as a new company” was the question asked at the beginning of this article. The answer of course is yes, but the operation has to be designed and engineered that way from the very beginning by management. In this respect, it is possible to cut short the traditional *learning curve* by investing explicitly with suppliers that are prepared to meet and support your well-being and long term goals.

Since it is not possible to increase the rate of the learning curve more than what is normally expected (red line, Fig. 1), advantages can be taken by starting with more suitable suppliers and processing techniques (blue line). Although it does not alter the natural curve, it puts the smarter company considerably

Fig. 1

DIFFERENT LEARNING CURVES
 Typical learning curve compared with that with suitable process training, equipment and supplies



ahead of it competitors. It is this very sense of achievement that makes the distinction between companies enjoying “extraordinary” success to that of “ordinary”. With the backing of supportive suppliers, a printing business could potentially put themselves ahead of the normal learning curve and be in a competitive profit mode to excellence much earlier than otherwise. It should be understood by owners and managers at this point that printers do not print excellence—management do!

Equipment

Equipment utilization, especially those used for pre-press, screen making as well as printing machinery and conveyORIZED dryers should not go without a mention here to achieve excellence at no additional cost. Unless proper training is dedicated on each piece of equipment to maximize benefits in every step of the process, ill-suited equipment and consumables will never return the desired results. Personnel should always be informed precisely about their job role and how it relates eventually to the final objective together with the importance of why tasks need to be carried out diligently and professionally as a team. Moreover, since inevitably equipment and parts of the process were never meant to handle every printers’ *idiosyncrasies* from new, management should be prepared to *tweak* them, as necessary, to best meet the level of quality expected for the markets served. Remember one very important point with regards to what a company needs to provide for its customers, equipment, supplies and techniques are totally blind—management is not!

Having said that, one ought to realize that most good things do come to an end. Such would be when the usefulness of a piece of equipment is no longer up to the standard for which it was intended. One should also remember that as physical printing demands continuously increases each year—equipment mechanically weakens simultaneously from its peak when new due to normal use and abuse. All too frequently, much money is literally thrown away trying to chase quality simply because an operation makes do with unsuitable pieces of equipment, but used simply because they happen to be there! Downgrading or outright replacement may be the only real answer if equipment cannot give the performance it once gave. Quality will never improve otherwise. Remember, printing equipment is not like good wine—it does not mature with age!

As for manual printing equipment is concerned, the keyword here is “manual. Although some of the worlds finest screen prints have been crafted by hand, printing manually by definition means the printer must be very good at his/her job. It is hoped that the writer will pen an article soon for this publication on strategies, techniques and what to watch out for when buying new equipment.

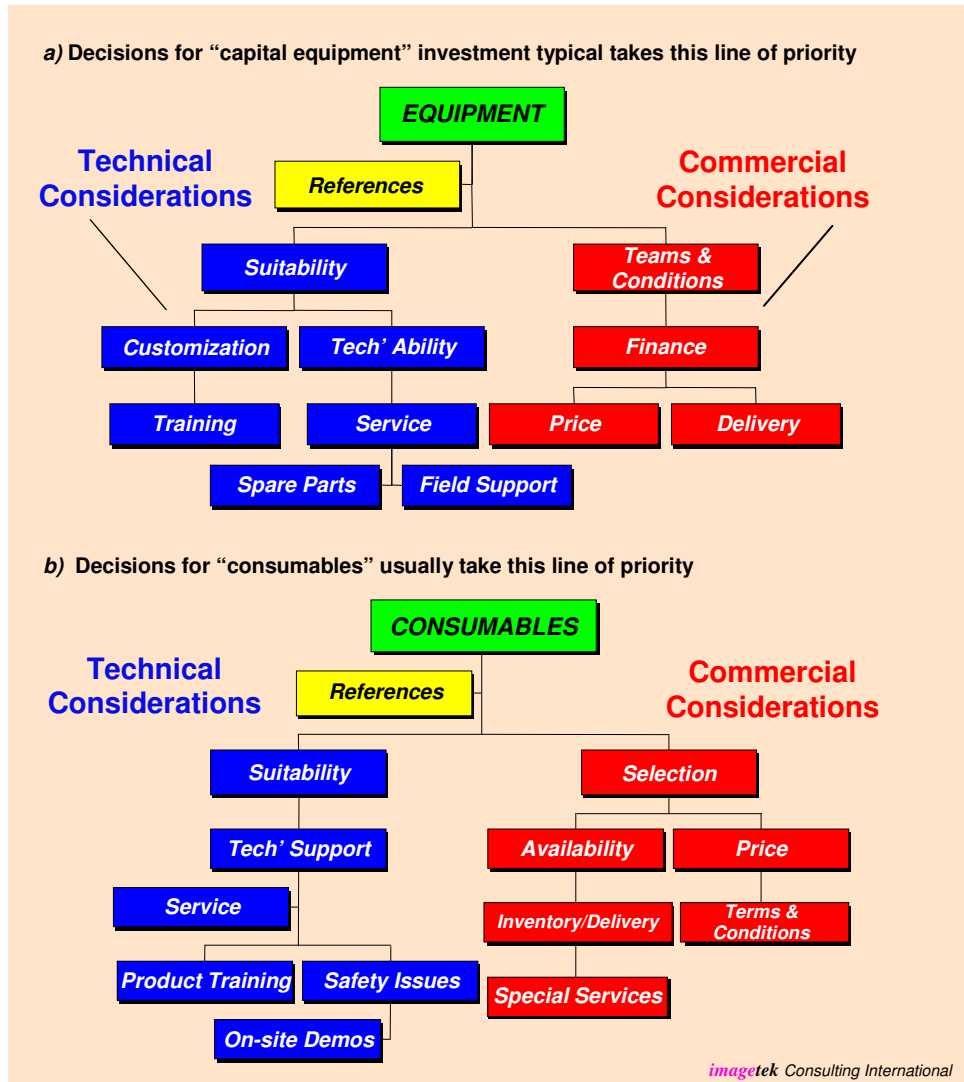
Purchasing Decisions

A very interesting observation was been made by a group of professional purchasing agents from the US regarding the so-called “decision making process,” during such times when sophisticated and demanding performance machinery is being negotiated for purchase. The reasoning behind the final decision for “capital equipment” takes on a different set of priorities, according to the market level being serviced, then those of consumable supplies. For simplicity-sake, those markets have been split into two groups or levels: low-to-medium and medium-to-high. Although the priorities charted in Fig. 2a may differ from each printer’s viewpoint and situation, it is nevertheless fascinating to note price and delivery is not so important as one might have initially thought. A similar picture also occurs with ‘medium-to-high’ consumable products, as shown in Fig. 2b. Here, both delivery and price seem to carry less weight than technical and support of the product. What appears to be more important is purchasing something that will yield the desired quality together with full manufacturers’ support yet be very profitable in production.

When combining both equipment and consumable products together, we come up with a depiction (Fig. 3) comparing two different purchasing decisions for each end of the two markets

Fig. 2

PURCHASING CONSIDERATIONS



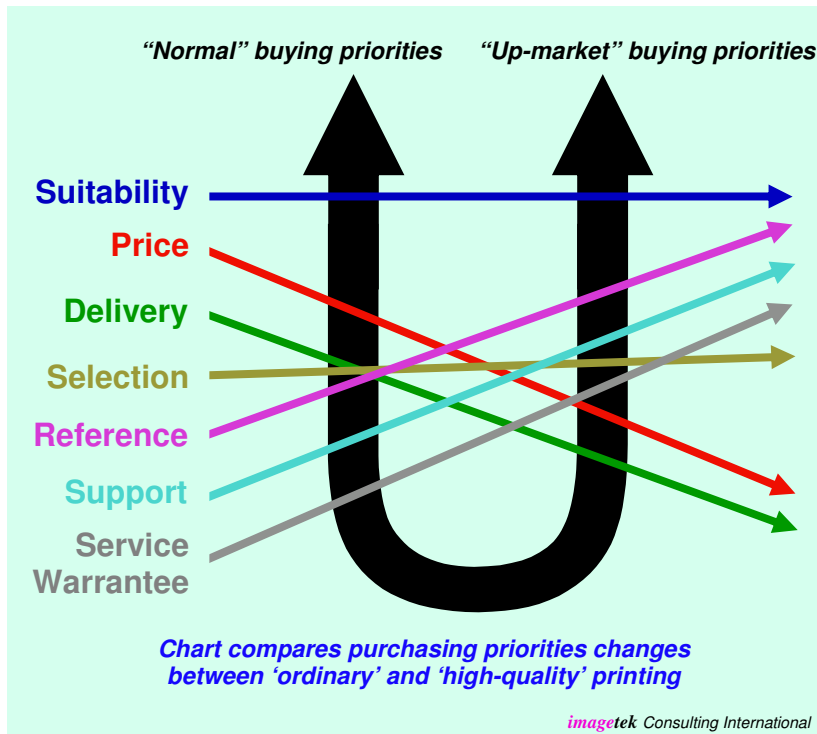
served—or at least approximating them. I call this a “U” turn profile because much of the importance weight in the decision-making process reverses itself. The reasons decisions are based on these findings appear to be rather indisputable even for allowing differentials in culture and economical disparity. Intrinsically speaking, *price* is a tangible value paid for a quality item or service. On the other hand, *cost* is the price that’s paid when the item does not hold up to the pre-conceived value. Put another way, “price” is *what* you pay today for the item brought while “cost” is *something* you continuously pay thereafter daily when it does not perform to desired expectations.

Remember what was said earlier regarding cheap equipment and consumable products not yielding a good return on invest-

ment and subsequently—quality. To provide the best in print excellence, one must therefore be concerned in dealing only with suppliers that handle suitable products to meet that required level, which in turn, enable your customers to eventually receive excellence too. The real difference in the extra price paid upfront for goods and services usually repay handsomely within the first year through better processing efficiency and quality performance. Working with low profit margins mean there is little room for mistakes. When using unsuitable products, one invariably pays the truer *cost* of that choice increasingly each year thereafter!

Fig. 3

THE “U” TURN ON PRICE vs. SUPPORT
How price and delivery considerations typically change for
conscious printers seeking excellence in performance



Technical Considerations

Preparation

From a practical point of view, it should be appreciated that screen printing is simply a *reproduction process*. As such, it can never better the original—much like a copy cannot be improved upon from a photocopier. It is very easy to make a bad copy from a good original but never the other way around. If the process of preparing screens (better known as screen making during the pre-press stages) or printing equipment’s *make-ready* are not up to the approved standard relative to the job, the operation risks losing all hopes of obtaining excellent results regardless of processing steps or equipment used. While it is easy to produce prints that will eventually be scrapped before it reaches the customer—it is almost just as easy to achieve excellence providing the tools to do it with are suitably apt for the level of work undertaken. All processing steps during pre-press preparation should be carefully engineered and monitored to meet jobs’ precise requirements.

Establishing a good pre-press program with a corresponding level of processing methods will make a huge difference to the end print result. With the appropriate means, materials and a systematic procedure to quality control all screens before they go out to the printroom—the operation will at least ensure printers have a quality tool to start with. The screen, while extremely important and a variable during the screen making process—becomes “fixed” for the printer. This means once it has been made and ready for printing, an operator can no longer change its size, fabric grade, tension level, image characteristics or structure of the stencil/emulsion coating. The screen

effectively becomes the “original” so nothing can be better than its present condition.

The need for quality preparation is a must for every level of printing. Essentially, one is trying to remove the dependability of a printer’s skill and push much of it into screen making. As mentioned, no one gets far with a badly made screen and printers can only use what is given to them for production. Put another way, an operation needs to depend heavily on the strong creative skills of printers (if they possess any) to get the best from poorly made screens. On the other hand, if screens were made to a high standard in the first place, it almost doesn’t matter what skills printers have or don’t have because production will at least have well-made image “tools” to start with and more likely reach excellence in performance than without them. Remember, it is not possible to better the original! Make the original (the screen) as perfect as possible.

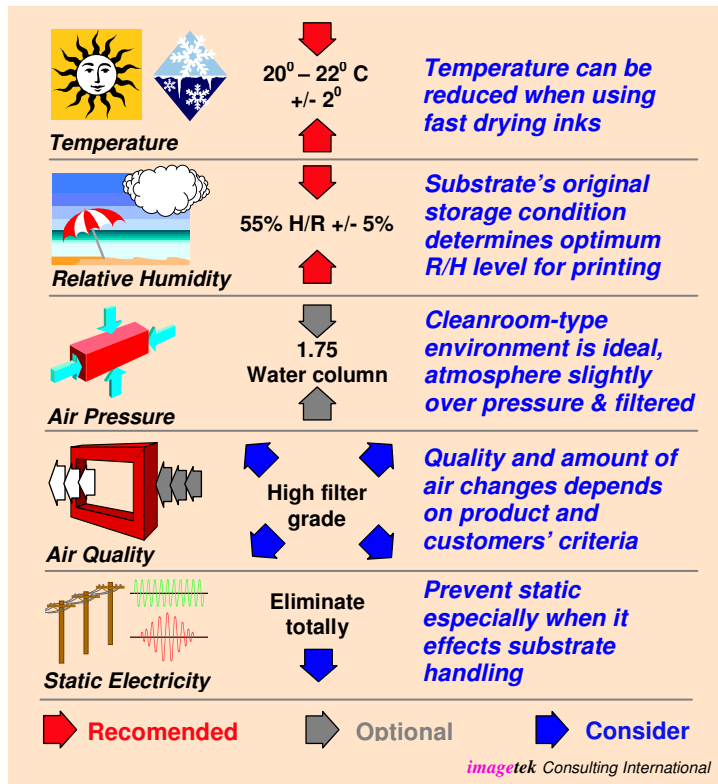
Workplace Environment

While on the subject of preparation, environmental condition of the workplace should not to be forgotten, which should ideally be controlled in one form or another, particularly inside the printroom. Controlling temperature and humidity are but two basic requirements for quality production where environmental issues are detrimental to the product, (Fig. 4). Some of those common issues will typically be excessive pinholes, scratches (due to dust particles), static, substrate shrinkage, etc, as well as other concerns with close-tolerance work and heat-sensitive materials.

Fig. 4

IDEAL CONDITIONS OF THE PRINTROOM

Suggested to keep better control over printing



Despite the cost to support such controls in the printroom, long experience has proven it to be less expensive than the high cost of printing waste, rejects and overall yield loss without any form of control. Depending on the type and demands of the work produced, particularly for high-end applications like graphic overlays, membranes, circuitry and instrumentation panels, EL lamps, etc., one can go a step further by pressurizing the printroom with clean filtered air. Furthermore, introducing means to eliminate static electricity in places where required, as we shall see later.

For types of work and applications that may require it, setting quality standards becomes more meaningful when they are accurately prescribed, measured and recorded while under controlled conditions regardless of regional location, time of day, climate or season. Ideally, performance within the workplace should be kept environmentally similar whether printing takes place in Mumbai or Kolkota, Delhi or Chennai. Regional location should never be an excuse for poor quality! Regions don't print—people do! Controllable environment, combined with good preparation, will always be the initial key to successful trouble-free printing. It has been said that *'spectacular prints are always preceded by unspectacular preparation!'* This message is probably the most prominent and perhaps the single most influential one that can be conveyed to anyone seeking the easy and safe route to print excellence!

Equipment

We touched on this subject briefly earlier and it should go without saying that all pre-press, printing and drying equipment must be up to an acceptable level to meet intended quality and desired production performance. If they do not meet this level

satisfactorily, equipment will then dictate and control what it wants to do. You must be the master of the operation, and not the other way around, by maintaining full control throughout each step of the production process. Equipment should therefore be in good working order, regularly serviced and properly calibrated at all times. Moreover, each piece must be built and designed to do the job for what it was intended for regardless of model range, degree of sophistication or automation level. Interestingly enough, all machines perform well when they are new—but what about two or three years later when they should still be top performers and earning the cream of profits! Impossible, no! It is no different than taking care of one's car; it will continue to perform like new if treated with respect, properly maintained and serviced.

As one implements the means to improve quality production, plan to reduce potential problems wherever possible. As an example, it is usually difficult for any company to specialize in providing printed products that require two distinct levels of quality: such as 'ordinary' and 'high-quality.' This is because business mentality behind the opposing levels discriminates against one another, and as a result, they do not mix well under the same roof, particularly with the same management, manufacturing equipment and production people. This is one of the reasons why car manufacturers do not produce basic models in the same factory as their top-end range or luxury models. Some go further by using different dealers and even brand names—such as Acura, Lexus and Infiniti to name but one industry that practise parallel marketing strategies. While such option is not afforded in our industry,

screen printing companies should nevertheless commit themselves to a higher standard and reappraise the whole department accordingly. Halfway measures simply will not work satisfactorily.

Speed vs. Yield

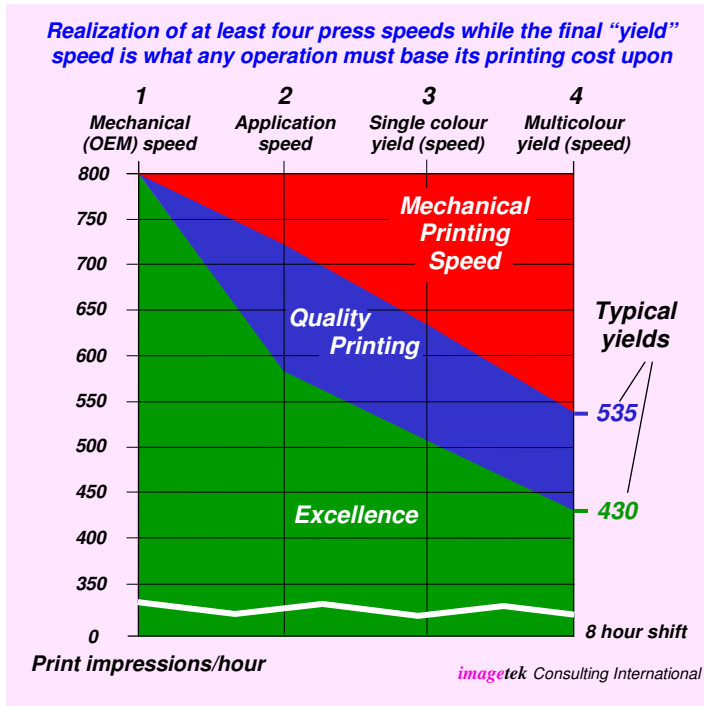
I was asked while presenting a seminar if I could comment on printing machine manufacturers' claims to press speeds, such as IPH (Impression Per Hour), because they typically quote high impossible-to-reach numbers. My immediate response surprised the audience because I stated that printing machines do not have one speed but intrinsically at least four! Let me explain.

OEMs (Original Equipment Manufacturers) usually publish the maximum *mechanical* speed their presses can "dry" print, as seen in the first column of Figure 5. The semiautomatic press in this sampling is based on a 70 cm x 100 cm print format, with a maximum mechanical speed of 800 IPH and the minimum amount of security delays programmed into the system's software. This effectively means the press cycles mechanically at maximum speed without it actually printing, feeding sheets or allowances made for any other kind of stoppages in the normal course of printing. Physically printing under these circumstances is generally not feasible as a rule and certainly can never be considered normal. If press operators have great difficulties in printing 'low-end' quality according to the equipment manufacturer's *advertised* maximum rate, what then is considered *reasonable* for 'good' or even 'high-quality' printing? In other words, mechanical speed is one that is fixed by the design and mechanics of the press and, as such, should be considered nothing more than simply theoretical, perhaps for comparisons purposes.

Fig. 5

PRODUCTIVITY vs. MECHANICAL SPEED

Various expected yields depending on quality sought from that of a typical high-speed semiautomatic press



The next column in Figure 5 reveals the second speed, which is real *application* speed for both quality printing and excellence performance. By definition, "application" speed (although *yield* is a more accurate word for 'speed') is principally determined by the screen, fabric, tension, image, on-press settings and squeegee parameters, ink, mechanical characteristics of the press and the nature of substrate together with its surface condition. A more realistic view of 'true' application speed (yield) can be seen in the third column, which allows for downtime or stoppages that better reflects actual production achieved within the normal working hours of the day. When printing two or more colours, however, yield is substantially lowered as shown in the fourth column. This is due to longer *downtime* for additional screen changes, set-ups, etc., and usually extra time spent to visually check print quality during each colour production run more frequently.

Despite the illustrated press' initial 800 IPH capacity, application speed drops down at best to some 720 sheets for quality printing (and subsequently 580 for excellence). For multicolour work, it can physically only return 535 sheets and possibly as low as 430 per hour respectively at the end of the shift. In the real world, this represents the normal expected capacity of a press (from its max.) for quality work as 79% and 67% for single and multicolour respectively. At the top end of print excellence, capacity is more likely to be 64% and 54% for similar single and multicolour production.

While these figures are just but examples for demonstration purposes, management nevertheless needs them in order to estimate correctly when quoting jobs and delivery expectations. There is no point running at a higher print speed if the required quality level is not possible. If the final "end-of-the-day" figure in production needs to be higher, consider reducing long downtimes between colour changes and job changeovers. This

would usually have a greater impact on productivity than anything else. It will be foolish to increase print speed in an attempt to improve productivity without first making substantial investment in technical and process changes necessary to suit newly applied pressure in production.

What is perhaps difficult for production managers to accept at first is diminishing productivity when increasing print quality. Usually, these are in instances where technical integrity of a print is somewhat more difficult to handle, or substrate to control, thus consequently slower to physically produce. Overall production speed (real yield) by the end of the day could effectively be down to less than 50% of the press' original mechanical speed! Amazing? Not really!

The reason this fact is mentioned is not so much to demoralize anyone that has recently invested heavily in new capital equipment but the pursuance of print excellence simply means accepting longer *production* time. Note the emphasis on "production." Even if the job took longer to physically print, the actual "time" spent completing the whole job is usually less because of not spending off-line production time fixing problems, reworking and sorting out the good from the bad! Owners, managers, estimators and printers alike, must recognise this factor since higher-quality and more demanding jobs mean reconfiguring greater print production time than otherwise. The upside is that since yield improves dramatically, the overall operation becomes an additional beneficiary due to being more cost-effective as well. It is then truly a win-win situation for everyone involved.

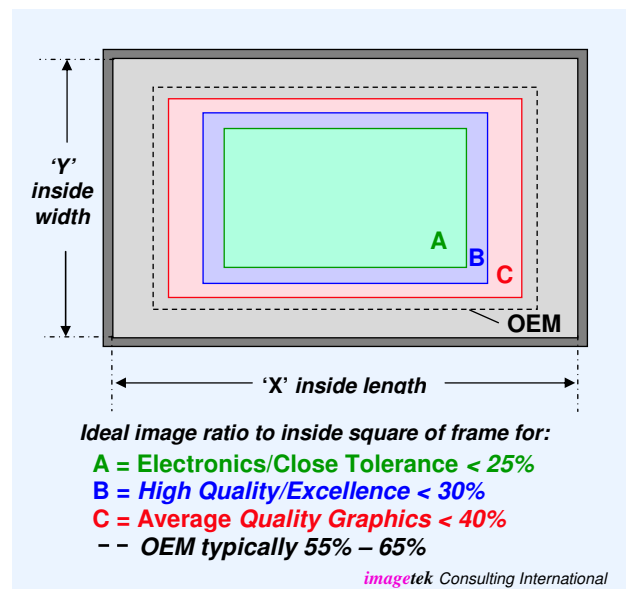
Frame Size

There are a number of what I call management "technical-understanding" factors that can make a printer's ability to improve quality of print, but perhaps the seven most dominating are: frame size, screen tension, off-contact distance, peel-off amount, squeegee length, pressure and registration methods.

Fig. 6

IDEAL IMAGE-TO-FRAME RATIO

Using healthy size frames to that of the image will always improve print quality automatically



Taking a closer look at them in order, utilizing larger frames will always enhance printing—as opposed to making do with smaller ones. It is simply not cost productive to use small frames in the hopes of saving money on materials. The greater a frame’s relationship size to that of the image—less problematic quality printing will be to achieve (Fig. 6). Within reason, always use the largest frame that the press allows. A great deal more will be written on this very subject later, however, suffice to say for now undersized frames make quality that much harder to obtain and excellence all but impossible to achieve.

Fabric Tension

A factor that heavily influences quality is fabric tension. There are no ‘ifs’ or ‘buts’ about it; higher screen tension directly results in greater overall performance—in virtually every aspect of the printing process! However, while the need of good tension is much underrated in the pursuit of quality, it is a lengthy and specialized subject and one that ought to be examined further as a separate entity. Suffice to say that print excellence can never be achieved using weak or badly tensioned screens. Since frame size and fabric tension are extremely important *tools* for high-quality printing, it is worth noting that they both become a *fixed* commodity for the press operator during the printing operation.

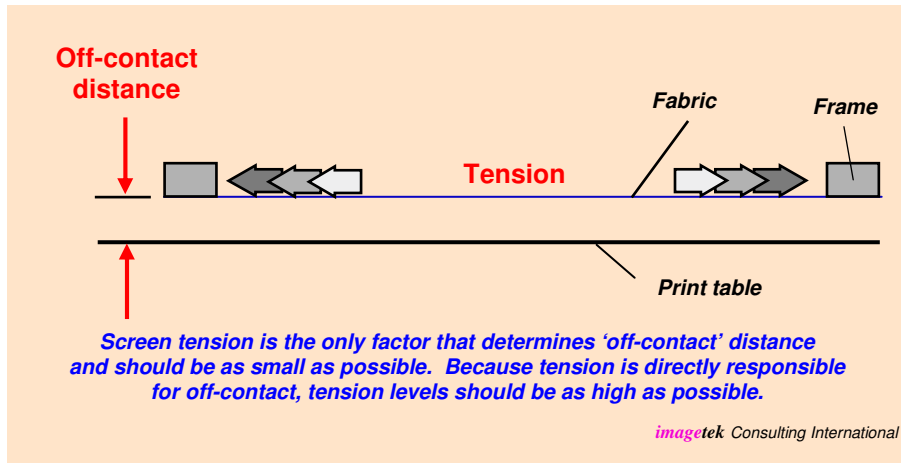
This fact should be realized because when a screen has been prepared and sent to the printroom, none of their influential characteristics can be re-adjusted. Screens become permanent fixtures! Operations that manually print will experience an immediate impact of high tension screens—albeit, even if a little more muscle is needed!

Off-Contact

There seems to be a lot of confusion about the use of ‘off-contact’ as opposed to ‘peel-off.’ Screen tension alone should be the only factor that determines correct *off-contact* distance

Fig. 7

DETERMINING THE CORRECT ‘OFF-CONTACT’ DISTANCE



and one that can either make or break quality up to this point (Fig. 7). Although operators can adjust off-contact when they feel like it, it should nonetheless be determined only by the tension in the screen fabric. This distance ought to be kept to an absolute minimum, but if tension is weak, higher off-contact has to be used detrimentally. Sometimes though, too much off-contact is used when screen tension may already be acceptable,

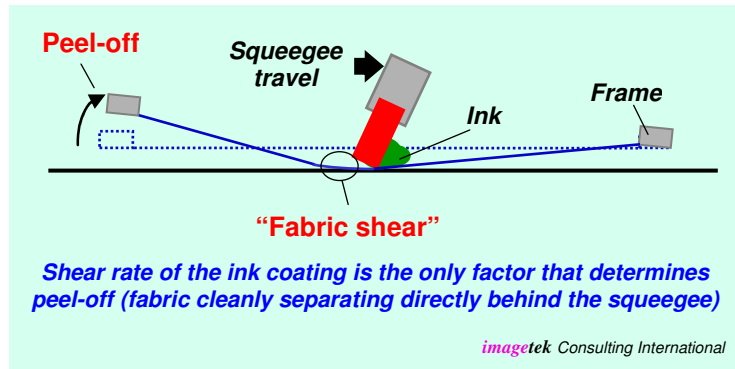
which then creates unnecessary problems. Therefore, off-contact distance must be kept as small as possible—otherwise a great deal more squeegee pressure will harmfully be required just to overcome the effects of an excessive distance.

Peel-Off

Another on-press mechanical function that enhances the print finish is “peel-off”—but only if required. Most modern printing machines are fitted with a peel-off mechanism, which allows the screen to gradually lift from the same end where the

Fig. 8

DETERMINING CORRECT ‘PEEL-OFF’ RATE



squeegee starts (Fig. 8). The screen effectively tilts and *peels* the fabric away gradually from the substrate during the print stroke. The idea behind this device is to promote a more controllable separation of screen from the substrate to ensure better edge definition and a higher overall quality of print.

However, in sharp contrast for the purpose of ‘off-contact,’ what determines the amount of ‘peel-off’ to use is none other than the shear rate of the ink, which is further governed by the size of image to be printed. Unfortunately, some operators

incorrectly use this feature as another form of off-contact. Too much off-contact, as mentioned, will damage the print and distort the image, so too will excessive peel-off. In an ideal situation, fabric ought to separate cleanly from the printed sheet just behind the squeegee during the print stroke (as circled in Fig. 8). When using viscous ink or heavier types of coating, fabric will naturally be slower to separate from the print surface, therefore, effectively reducing definition and overall image quality. The answer here is to increase peel-off, a little at a time—not the off-contact. Remember, off-contact distance has already been pre-set according to screen tension. Excessive use of either feature will be detrimental to

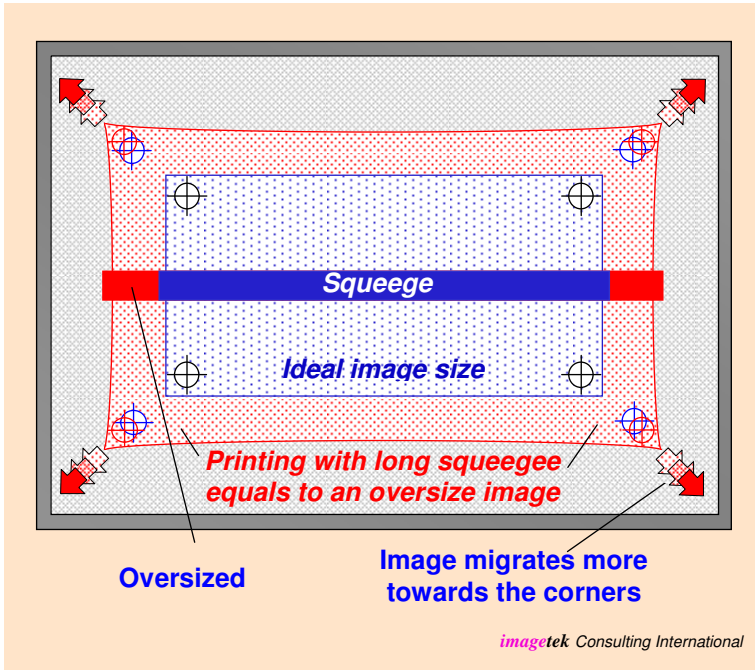
excellence as mentioned. If a press does not have any type of peel-off device, one is then forced to use off-contact further as a substitute, which means more care has to be taken in its use.

Last word on the subject; the need to use peel-off is not automatic. This means if all screens are well tensioned to the

correct levels that correspond to fabric tensioning recommendations, peel-off may not be required at all.

Fig. 9

EFFECTS OF UNDERSIZED FRAME OR OVERSIZED SQUEEGEE LENGTH



Squeegee Length

A seemingly innocent but very common error that can make quality difficult to achieve is using a squeegee blade that is too long for the image size. Squeegee length has a much greater influence on image performance, in fact, than what most people realise once production has started. In reality, an oversize squeegee is a very destructive tool while its end result is similar to that when using an undersized screen frame for the image. Most press operators understand that “image-movement” (sometimes called screen *stretch*) tends to stretch towards the outer edges and further into the corners once the image has been printed. Such can be a big problem for die-cutting multiple images.

Figure 9 illustrates image stretch when the image is clearly too large for the screen or a squeegee excessively longer than necessary beyond the image area. Even if the ‘image-to-frame’ ratio is healthy, an oversize squeegee can still be detrimental to overall image size integrity. It is important to realise this significance since it usually comes down to the operators who choose what squeegees lengths to use. Those chosen without due care could then easily destroy the goodwill and techniques already built into the job up to this point! The blade should ideally not extend beyond the image by 2 cm at either end. An easy housekeeping rule to remember is, “*always use a squeegee that fits the image—not one that fits the screen!*”

Squeegee Pressure

Using too much squeegee pressure is the fifth factor to consider here. For the majority of applications, the most desirable profile of the blade during the print stroke should

resemble something like the one illustrated in Figure 10a. The second profile (Fig. 10b) shows the same squeegee blade but with too much pressure. When more pressure is applied than necessary, ‘true’ print angle changes considerably, as well as other influential characteristics that may be detrimental to the finish print. Naturally, one cannot print without enough pressure, but unfortunately, it is all too easy to print with too much. Do not make this simple mistake—too much squeegee pressure will always damage the quality of any print, on any press, with any ink.

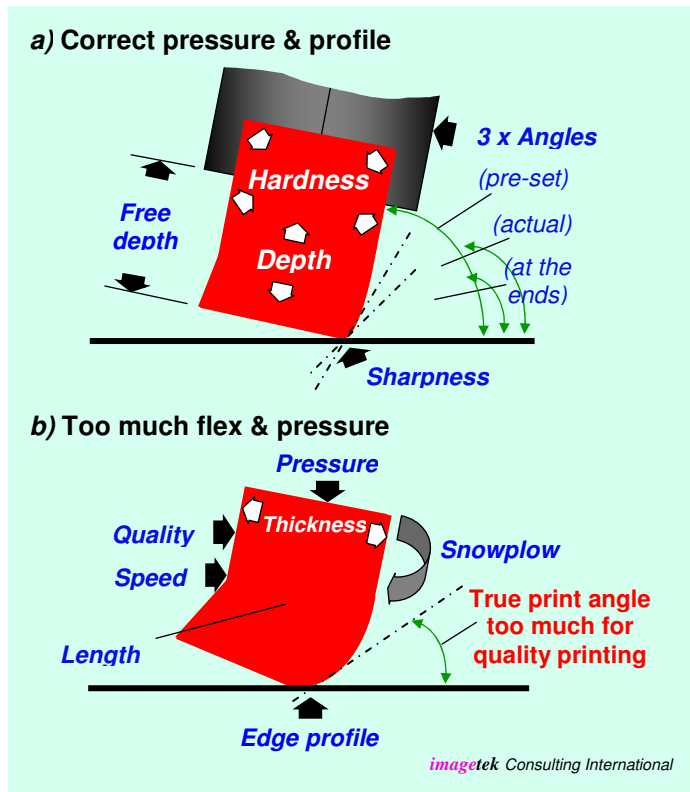
From an academic point of view, it is worth noting that a squeegee blade typically has at least 14 independent operational components—all which can harmfully interact between themselves when not fully understood, controlled and used properly. This is not the time to discuss their individual characteristics or features here, since most are exhaustive to explain, but to recognise that the squeegee is a very important complex tool to achieve excellence. The whole process of printing is after all, brought together at the tip of the squeegee blade. This is similar to the tyres between one’s car and the road. Give it the respect it deserves. More about the squeegee blade will be published later in this magazine.

Registration

There are other ideas and techniques that should also be considered to improve print excellence.

Fig. 10

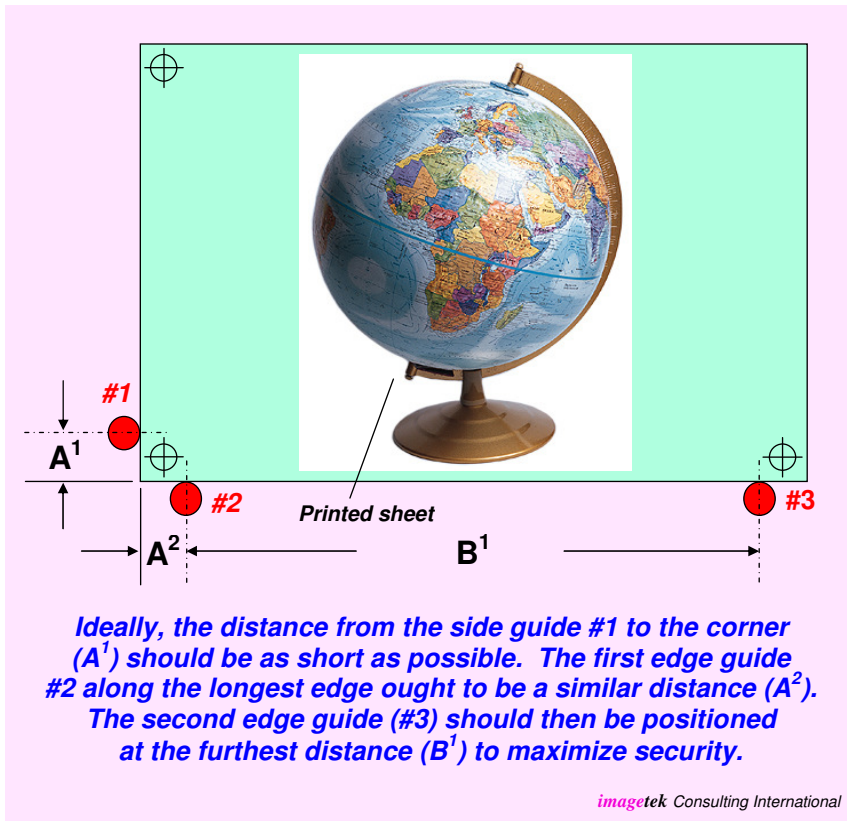
SQUEEGEE COMPONENTS
Profile of a squeegee while printing together with at least 14 different components shown



Try to standardise on a common registration method used throughout the printroom on all presses that do not have built-in mechanical ones in the print table. Similarly with screen tension and squeegee characteristics, registration is quite a lengthy subject by itself and ought to be reviewed another time in depth as a separate issue. Briefly, however, it is generally recognized that the most desirable method of registering against a sheet's edge is to use a 3-point contact system (Fig. 11). It is important to realize that not all 3-point systems are created the same—and never ever use 4 contact points!

Fig. 11

PRINCIPLE OF A 3-POINT REGISTRATION SYSTEM



For optimum 3-point configuration, simply position #1 edge guide the same distance from the corner as #2, say no more than 2 cm away. The third guide #3 is positioned along the other end of the sheet's longest edge, also about 2 cm away from the corner. Registering in this fashion is by far the easiest and safest way to feed without problems. It allows the greatest freedom and yields maximum dexterity for an operator to manipulate substrates smoothly against the edge guides, without a false sense sheets are in register when they are not. Once a chosen configuration becomes acceptable *in-house*, a similar layout should be devised on other equipment—such as die-cutting.

It is also important to use the smallest contact point against the substrate's edge for greater registration accuracy, and if practical, use thin hard round guides, such as 2 cm in diameter. Long edge guides, say of 5 cm in length, serves no useful purpose. There are several other customized registration methods available but they should only be considered if a 3-point contact is not practical for a given material or product.

Options

In addition to techniques covered, there are at least five readily available options that ought to be considered as needed. They will help to make the whole operation much healthier and easier for the printer to deal with and improve upon performance productivity-wise. In no particular order they are:

- Squeegee sharpener: Strictly speaking, this should not be considered as an option but a necessity for any printing operation handling medium quality and higher. Prior to each job, a squeegee blade should always be checked for a blemish-free edge and sharpened if necessary—even if a rounded or dull edge profile is used.
- Squeegee pressure-equalizing system: Featured under different names, they are mostly found on sophisticated flatbed presses and cylinders. The system helps to keep the squeegee balanced evenly to the substrate, irrespective of its physical positioning, and, should yield the optimum (lightest) pressure for the job when used properly.
- Anti-static devices: They come in different types, shapes and sizes to handle a host of situations. For example, they can be used *in-line* (on the printing press itself) in several locations, affixed to a dryer/curing unit or *off-line* (either as a hand held device or feed substrates through a standalone system immediately before printing). The aim is to increase quality throughput by improving handling characteristics while reducing waste and ink coating problems caused by static in the material.
- Squeegee “snowplow” angle: Printing with a squeegee slightly askew (oblique) in either axis to the printing direction permits better edge definition, reduces saw-tooth effect and helps to prevent moiré with four-colour halftone or monotone work. Caution is stressed if too much angle is applied, as it will create a ‘S’ shape-like image distortion.
- Digital readout: This feature is more suited usually for electronic and industrial applications. Correct reading of important parameters, such as squeegee, flood speeds, off-contact distance, etc., is a blessing for consistency, quality control, record-keeping and troubleshooting and particularly ideal for companies seeking ISO Certification.

These devices, together with the squeegee sharpener, must be rated as the most important and influential *tools* used inside the printroom to promote ordinary quality to one of excellence. It is worth discussing each option with your suppliers as well as perhaps others not mentioned here. Their sole purpose is to enhance print quality and productivity while better controlling and maintaining the all-important printing parameters routinely and consistently.

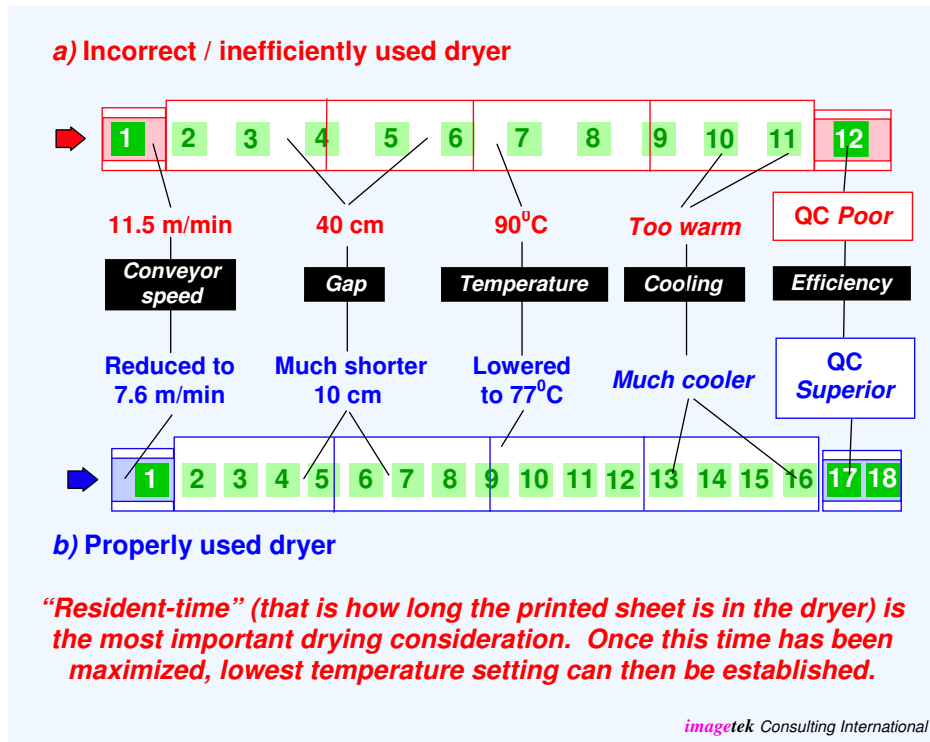
Drying

Last but not least is the conveyerised dryer from an equipment point of view. For correct terminology, solvent or water based inks “dry” through a heated jet air dryer while UV inks “cure” instantly in a curing unit or reactor (term interchangeable). The drying part of the operation should not be looked upon simply as a process to dry the printed ink but also of substrates’ stability to maintain integrity with print registration. A dryer set incorrectly is very likely to remove too much moisture from the substrates, thus causing them to shrink dimensionally in size. Close tolerance work often becomes difficult to achieve because one colour will not accurately register against another due to substrates moving out of shape or size. Providing everything traced back to artwork and screen making is correct, the likely reason for this problem is that the dryer may not have been setup properly for efficient drying. For instance, sheets might have shrunk a little while the previous colour was printed, due to too much heat, but enough to make registration of subsequent colours all but impossible to achieve.

Fig. 12

USING CONVEYOR DRYERS EFFICIENTLY

Comparison of two drying scenarios, both with 3 heat & 1 cooling section for sheet size of 500 x 700mm at 750/hour



In Figure 12, heated air dryer *a*) is clearly going too fast for the production output rate. Just by looking at the spaces between each sheet shows the conveyor should be slower to be more efficient. What typically happens in this type of scenario is higher temperature has to be employed instead—albeit incorrectly, in an attempt to compensate for the shorter or inadequate drying time. However, by slowing down the conveyor to match physical production rate, as dryer *b*) shows, printed sheets are inside the dryer for a longer period of time, about 30% more in this example. The damaging effect of using high temperatures can then be reduced significantly. With most heated air dryers (either by electric, gas or IR), *resident time* is

the most important operational factor—not temperature! (Resident time is the length of time a sheet stays inside the dryer.)

Once conveyor speed has been correctly set to match productivity output of the press, lowest possible temperature for efficient drying can then be established with complete confidence. Since sheets will then benefit from a longer residence time and be exposed to less heat, they are less likely to change dimensionally in size. As a trade-off, the dryer will be less expensive to operate and printed sheets cooler on exit. This effectively promotes superior handling for deep pile stacking since the sheets are less likely to re-wet or block.

Unlike conventional solvent-based inks, UV ink requires curing to take place in a UV curing unit (or reactor) at the shortest residence time that provides proper cure and adhesion. The reason for this seemingly reversal is that Ultra Violet is a very fast reactive curing system, but unfortunately, many types of UV lamps emit a lot of heat from its output source. Once ink coating has been cured, there is nothing further UV can do except transmit more unwanted heat, thereby risk damage to the ink surface and potentially change the dimensional size of the printed sheet as a consequence. With either ink system, suppliers will usually help any operation to setup the optimum drying/curing protocol.

Final Ten

In the accompanying sidebar, it contains a self-judging rating to see if owners or top management have the mindset of what it ultimately takes to reach excellence in printing. In addition, below are ten bottom-line considerations that can help to enhance overall quality providing the operation learns how to take full advantage of them to meet planned objectives.

- Condition of workplace
- Image-to-frame size relationship
- Screen tension
- Fully compatible pre-press and screen making programme and procedures
- Press make-ready and suitable dryer setup

- On-press controls/options
- Squeegee length
- Appropriate quality control record keeping
- Continuous training in every facet of the process
- Preventative maintenance programme

Summary

Through carefully addressing of each concern covered in this two-part series, they will all go a long way to support the

necessary tools and means to achieve excellence in the world of screen printing. In the continuous pursuit of excellence, one should always seek ways to do the job better and smarter—not cheaper. By doing it a smarter way—it comes significantly more cost-effective by default. Never be afraid to ask questions from experts, learn new ideas, methods, exchange ideas and experiences. Recognise too that improvements and implementing smarter techniques is a challenge to everyone but necessary to face. The constant struggle for improving quality is the main difference that separates one screen printing company with ten years experience to another having only one year experience ten times!

I urge you to review the self-judging sidebar on management skills and mentally in Appendix A. One final thought in reaching for the optimum returns in screen printing—consider “small” is great! Keep the overall image *small*, use the *smallest* size image on a frame, adopt the *minimum* off-contact distance and *lowest* amount of peel-off setting (if any), employ the *shortest* length squeegee, the *lightest* pressure, the *smallest* register contact point and print at *slower* speeds to eliminate interruptions. Only then will one see and feel the difference!

Thinking small and smart is the gateway to print excellence.

Respectfully submitted by Mike Young, Imagetek Consulting International, 28 April 2004



About the writer:

British-born Mike Young has been a specialist in high-definition graphic and industrial screen printing for more than 30 years. He is a SGIA Fellow, a member of the Academy of Screen Printing Technology, recipient of the prestigious Swormstedt Award for technical writing. He is also a frequent contributing writer to trade publications, SGIA Golden Imaging Award print judge, legal expert witness and a popular speaker at industry events. Mike is the creator of the internationally known **Troubleshooting Chart** and published several technical books on advance screen printing techniques, including **The Register Guide** about achieving print excellence. Mike has conducted business in India (Mumbai) previously and he operates Imagetek Consulting International, a Connecticut USA-based consulting firm, which trains and troubleshoots screen printing operations worldwide. He can be reached at www.imagetekconsulting.com or mike@imagetekconsulting.com

APPENDIX A

Self-Judging Test for Management Excellence

Now that this article series have covered some important ground as to what it takes to provide excellence in screen print, the following is a simple self-judging test for owners and Managing Directors to see who and how your operation is being managed. It is not intended to fit all company's management structure in all situations, but to serve to see if the mindset and heart is in the right place to reach and retain excellence in performance.

1. Have you identified your people in management?
2. Does a written record of requirements and objectives cover each member of your management team?
3. Have you assessed your staff and assigned the appropriate management personnel through provision of written requirements and objectives?
4. Has each staff member been educated and thoroughly trained in how to meet each job requirement and objective?
5. Have you held your weekly meetings with each direct reporting member of management to review their progress and made sure they have conducted their meetings with their direct reporting personnel?
6. Is at least five hours of each business day spent physically overseeing the operation?

Scoring

If you answered yes to questions 1 and 2: You have a good foundation of people requiring management and have converted such into job descriptions. These two sets of tools are critical, but offer no reward at this point because none have been assigned for completion.

If you answered yes to questions 1, 2 and 3: You have achieved what has been stated previously with the additional benefits of demonstrating your ability to delegate. You have relieved yourself of needless workload, creating more time to manage the future of the business. The risk is that it is up to the production personnel in how best to accomplish their job requirements and objectives. They may choose a different means than you would like, because they lack your specific training, education and other related knowledge.

If you answered yes to questions 1, 2, 3 and 4: You have achieved the positive rewards of number 1 through 3 and now have added specific training and education in how each member is to achieve his/her goals and job requirements. This creates the added benefit of business efficiencies that best fits your style, size and way of doing business that reduces the cost of mistakes and lack of productivity. What is lacking is the management fuel of recognition to sustain the personnel's' productivity for any length of time.

If you answered yes to questions 1, 2, 3, 4 and 5: You are in a great position. Your entire operation is running under a long-term management philosophy and procedure that will maximise productivity and operation efficiencies that can provide excellence. With what the market provides, you have capitalising on such opportunity at the highest reasonable rate possible. The only thing lacking is future development, long-range planning and best-of-business growth plans.

If you answered yes to all six questions: You are able to achieve the best of both worlds: an operation run in the most efficient and effective means possible and the long-term positioning of your company for future growth and development. Operations control costs while growth and development increases revenue. Added together, the highest retained earning and profit are secured.

It should be mentioned that answering all six questions in the affirmative does not guarantee excellences—just as excellence can be achieved in situations where there is no formal management control. However, for assurances, repeatable sustained performance and effective profitability, there is no substitute to having the right management structure in place, regardless of company's size or turnover, to ensure goals can be readily met with solid confidence.

Source unknown