Printers Blankets example to the printing industry

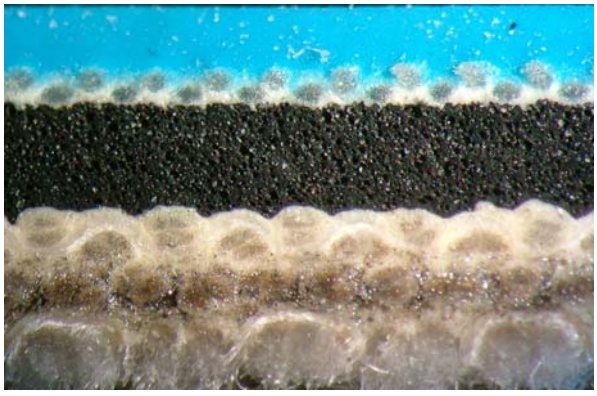
As used in the offset printing industry a printers blanket does transfer information from a plate to a substrate assisted by pressure. But the printing industry evolution has forced the addition of detailed consideration of a multitude of complex variables such as viscosity, surface tension, wetting, drying or curing, solvent affinity, abrasion and chemical resistance or reaction cross linking degree.

Carcass cloth surface showing rubber 'spots' from the first to the second ply gluing film. These spots are suggestive of reinforcement fibres being well impregnated by the rubber matrix.

Most motor tyre manufacturing groups mastering considerable technology resources have had experiences in the manufacture of printers blankets its production being frequently included in their specialties department dealing with a wide assortment of rubber products ranging from miniature components for office ink jet printers or other electronic gear, transmission belts or maritime dock fenders to golf balls including even in a few cases non rubber high technology composite products like golf clubs and tennis rackets. A few of these organisational examples still exist today.

Diaphragms for motor fuel pumps have also been produced with the help of the same rubber spreading equipment used for printers blankets. But diaphragms size range and working requirements being quite distinct from those of printers' blankets, the use of common equipment has not proved to be an easy exercise.

Some inflatable pleasure boats and life raft factories using spreading equipment on their rubber coated fabrics have also dared into printers blankets' production, but so far their impact in this market has been modest.



A typical compressive blanket with four plies. Please note the voids free structure and reinforcements almost vitreous look.

With distinct directional properties in their composite textile and rubber multilayer structure printers blankets make extensive use of mechanical and chemical technologies in its design. These technologies have been better served with modern tools and experience only available after the introduction of the transistor and subsequent integrated circuits (contaminants, voids and wetting) and of the aerospace industry development following the moon conquest frenzy (matrix to reinforcement stress transfer and temperature performance).

In recognition of the unique printers blankets' characteristics and task several factories have existed exclusively devoted to its manufacture with highly technological projects. But those companies were not to survive alone for one reason or another. Two major independent printers blanket manufacturers were recently acquired by a conveyor belt specialist in the transport of wooden logs and chips for the pulp industry while another independent blanket group

conglomerating a number of different brands became a division of a printing ink multinational manufacturer.

Roughly with a world annual output of 20 thousand tons only, soon were the printer's blankets driven to a poor relative' status of the large motor tyre industry, probably explaining the cyclic turbulence printers blankets factories have lived for more than a century.
And regardless of offset industry evolution production of printers blankets will become smaller as more expensive, longer lasting and more consistently produced new models will replace ageing blanket concepts.

It has been common practice with a number of printers' blanket manufacturers to dispose of "second grade" blankets at discount price, in not very demanding markets and customers.
But in the actual global village reality, and as a result of a blossoming number of irreverent commercial practices, "second grade" blanket's trade is becoming increasingly profitable.
Besides Internet advertisements from the Asian poppy area with buying offers for any blanket's rubbish, "bargain" blanket rolls lists are currently available for trade in Europe at up to 70% off the regular price list.
However printers are hardly "enjoying" from such bargains, which are finally sold with still attractive looking 20 or 30% discounts.

Western and Japanese groups have established printers' blankets production units in China thus lending a much appreciated helping hand to the Chinese competition.
Over the last 20 years several factories have established a Chinese printer's blankets industry taking contemporary printers blanket technology as their starting point.
Contrasting with some amateurish solutions, a few Chinese manufacturers are adding new sound production procedures and promising blanket structure solutions.
However, while some of their products and respective evolution are worth close professional attention no hurried enthusiasm is recommended as a number of basic problems are yet to be solved by the Chinese blankets industry, like the ability to manufacture wide rolls and to produce surface rubber compounds other than for conventional offset printing, among others.

The laboratory is ~~boring~~ fun
Maybe except for the old DIN 16621 standard, the printer's blankets had not undergone a sustained standardisation effort until around two decades ago ISO Technical Committee TC130 undertook the task of converging a printer's blankets standard as a result of the active participation of a dozen delegates from printers blankets manufacturers and other printing industry specialists.
ISO 12636 standard was issued in 1998 including definitions, evaluation parameters and a number of minimum performance values of printers blankets.

Despite the extended discussion preceding its approval and its positive contribution to the industry ISO 12636 text provides insufficient product

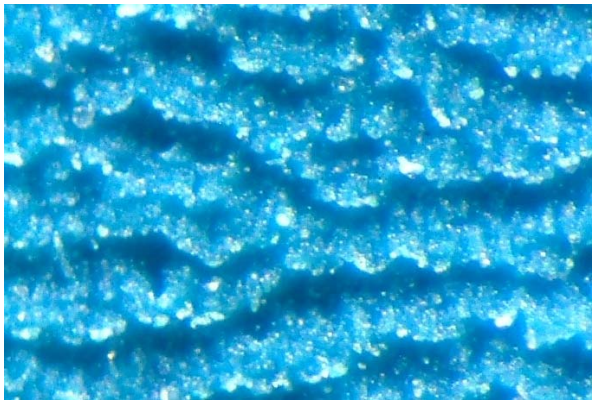
characterisation reflecting different interests, industrial experiences and cultures of participating members, a few bits and pieces having been left loose.
Curiously, blanket manufacturers have not eagerly spread the use of such a powerful evaluation tool for their own knowledge and further development benefit, while enabling to relate blankets performance to the respective parameter values.
Some printer's blankets commercial leaflets do include an odd parameter value said to conform with ISO 12636 standard, however different testing routines having often been used.
Data sheets do usually include parameter sets of values. But its presentation is often not consistent over the full blankets range and thus it is flatly impossible for the printer to compare products from different sources. Useful blankets' life prediction test results are not yet made public, as thickness alteration by the action of typical chemical compounds found in the printing environment.

Printers' blankets have been generally considered by the printing industry as a consumable.
However if advantage is taken of a certain similarity to motor tyres, a rather more accurate appraisal would consider instead printers blankets as wearable printing equipment components, which selection does determine overall press performance and even its end use adaptability.
A good blanket will print up to several million prints containing one only or several completely different messages. Printers' blankets account approximately for ~0,1% of printing costs but for ~30% of overall printing performance.
Maybe time has come for printers to carefully reassess the importance of printers' blankets in their operation economy.

It is becoming common printers' practice to require batch quality certificates from major raw material suppliers.
Printers willing, the same principle may be applied to printers blankets purchase, being enough to negotiate with blanket suppliers a schedule for the regular delivery of batch quality certificates and respective contents.

(**Box**)
It is common printing experience to have blankets replaced after less than 100 thousand prints up to more than 10 million copies: A staggering printer's blankets life variation of up ~1,000fold.
Blankets still exist on the market based on manufacturing procedures and concepts not easy to reproduce under factory conditions.
Thus blankets obtained from different jobs do often present noticeable printing performance variations which fact in itself is an explanation of why just a few factories have popular web blanket models included in their manufacturing ranges.
Regardless of how deeply blankets' characteristics variation may affect a particular printed document, every time adjustment is required to the job's make-ready routine, overall printing operation costs will be increased.
Similar reasoning would apply to blankets chemical resistance and its resulting useful life.

Wear characteristics of printers blankets follow exponential patterns and a major trick to avoid an unacceptably large performance variation depends on its adequate and very careful surface rubber compound choice and on the respective vulcanisation operation.



Blankets surface relief showing almost translucent and very delicate rubber crests. Whitish grinding residue spots still remain on crest tops. Interactive film clips would also present a very soft and elastic rubber surface and illustrate the difficulty of removing any uncured residue.

During vulcanisation liquid rubber compound would ideally convert into an elastomer with 100% solids. Such a perfect reaction does not exist, some uncured rubber residues being left after vulcanisation.

Vulcanisation is a reaction usually assisted by a catalyst – an element which presence is essential for the reaction to happen but that is not consumed during the reaction – finally becoming an impurity in the final elastomer.

The better the catalyst dispersion in the liquid rubber compound the lower amount of uncured rubber will remain and the lesser importance the catalyst impurity will have after vulcanisation.

During printing, catalyst crystals being not a part of the elastomer will tend to get loose and to detach from the blanket rubber surface, leaving holes which amount and size may account for the well-known ghost from previous plate images.

A blanket surface rubber with a catalyst crystal incrustation with 260 x 40 μm after being easily removed from the elastomer surface and the respective hole.

In a similar way extremely tacky uncured rubber residues are likely to become loosely linked to the cured elastomer. Depending on the rubber residue amount its presence will dramatically impair blanket release and cleaning properties before each of its minute particles will also in the end get detached adding another hole to the elastomer surface.

And the beauty of printers blankets production method is that laboratory analysis of even small blanket samples will reasonably portray the respective behaviour in the press.

Biographic Note:
The author, Duarte Miranda, graduated from IST, Lisbon, as electrical engineer in 1964.
With more than 30 years composite materials experience, in 1985 he became technical director of a Dunlop blanket's factory. Since then his professional life has been linked to printers blanket