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V. Schlevoigt\*

# Spot-Pattern Strobe Light Spotlights Formation Problems

The ability to focus on small anomalies is the big difference in making paper that meets specifications or doesn't. Overlooking or missing small details can sometimes cost huge amounts of money.

Paper mills rely on skilled, experienced operators to look across the width of their papermaking machines and spot stock jumps that are off by mere millimeters. Small variations can lead to uneven surfaces and defective product. But they can also lead to breaks at the area where the defect's cause is present or – more often – somewhere else along the paper machine. Being able to find those variations and make adjustments as quickly as possible can determine whether a production run will be profitable.

For years, machine operators and engineers used strobe lights with a flood pattern to look at paper formation, and many still do.

They can sync the lights with still or video cameras to record images for further study, and practically everyone who works in the mills considers them indispensable for viewing anomalies on the papermaking machine.

While strobes with flood patterns of light do a very good job of showing problems, they have become less effective as the widths of papermaking machines have expanded to 11 meters. Because the light intensity scatters over distance, even the most powerful flood-pattern strobes can only provide an adequate view halfway across the web. If operators and engineers have access to both sides of the machine, they can carry the light and its stand to the other side. This makes it possible to inspect the entire web, but the viewing is still less sufficient at the middle.

A strobe light with a spot pattern, such as the Beacon from Unilux, improves inspection capability significantly. Using different reflector technology, a handheld spot-pattern light can focus its brightest light on a point five times farther than a stand-mounted flood-pattern light. When an operator or engineer sees a suspected anomaly, the ability to direct the strobe light's greatest concentration of power to the spot can immediately let him know whether further inspection or action is required.

As more and more mills get their first look at



**Fig. 1:** A spot-pattern strobe light such as the Unilux Beacon provides enough light in the center area of the wire to monitor high-pressure jet sprays. Clear nozzles are required to produce a spray that will clean the wire after a production run and prevent contamination, which can result in defective product, on future runs

a spot-pattern strobe light, their first reaction is that they can see the center more clearly than they could before. They can also look at places they never could before, such as the spray nozzles underneath the center of the machine. This is a critical place to examine because plugged high-pressure nozzles, usually set at around 20 to 25 bar, can cause dirtier zones in the fabric, leading to uneven profiles in the web. If the strobe light is not strong enough to shine through the mist in these areas, mill operators will not be able to effectively detect these plugged or wrongly set nozzles. Missing problems with the spray nozzle



**Fig. 2:** The Unilux Beacon spot-pattern strobe light can show the efficiency of the web trimming process. Good lighting enables operators to observe trimming in more detail; keeping trimming within specifications can prevent many costly breaks

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Fig. 3: This is the result of a properly functioning trim jet

zles can cost a lot of money because of more frequent changes of forming fabrics, decreased production, or the need to give commercial discounts to the mill's customers or printers because the paper did not meet standard quality specifications.

### Clean Underneath

One of the key contributors to good formation across the machine's web is a clean wire. The wire is cleaned by high-pressure spray nozzles that wash off debris after a production run. It only takes a few bits of debris to cause stock build-up on the wire and contaminate the next production run.

A strong strobe light with a spot pattern can enable a machine operator to spot inconsistencies in stock jump during formation. The inconsistencies indicate a problem, and the variation in the amount of jump can indicate severity. But being able to find the defective nozzle has always been another story. Flood-pattern strobe lights don't throw enough light to effectively inspect the spray nozzles under the machine, and unless an operator or maintenance person uses a handheld strobe, it's difficult if not impossible to light the nozzles.

With a handheld spot-pattern strobe, operators and maintenance personnel can look under the machine and examine the nozzles to determine which may be clogged and unable to provide the spray pressure needed to clean the wire. The focused light concentrates its power – and light – on a much more specific area, enabling mill personnel to pinpoint the location of the problem.

In the press section, they can perform an inspection sequence using a spot-pattern

strobe to uncover a number of problems. If the high-pressure shower is non-laminar or not aligned, it could damage and/or plug the felt. They can also look at the pick-up felt to see if the trim jet has cut the sheet properly and check the edges of the felt for wear.

Two other key uses for the spot-pattern strobe are verifying dewatering at the press and checking the return rolls and pick-up roll.

Contaminated paper from wires that have not been completely cleaned by the spray nozzles is a problem in most paper mills. But when mill managers see the capability of a spot-pattern strobe light, they view it as a solution to a long-standing need.

### Efficient Trimming

Efficient trimming significantly reduces breaks. One key requirement for running

the paper machine efficiently is trimming the edges of the web at the end of the forming part, before the paper enters the press section. Even cleanly cut web edges will avoid edge breaks later along the paper machines, when the web comes into free draws between the press and drying part or from one drying group to the other.

Although often placed in full light, the trimming systems and jet require careful setting of the angle, jet, distance and position. Without a strong stroboscope, this delicate setting is nearly impossible. Very often, papermakers underestimate the amount of breaks due to bad trimming. But when a mill has the proper tool to fix this in everyday operation, it can save substantial amounts of money. A strong spot-



Fig. 4: The spot-pattern light from the Unixlux Beacon shows the dewatering at a press roll





**Fig. 5:** Using the Unilux Beacon allows operators to see that the high-pressure shower is not working correctly. The shower is non-laminar or not aligned

pattern strobe, such as the Beacon, allows operators to see directly if the nozzle jet is still laminar, i.e. straight, when cutting the web. If there are projections due to bad angle or if the nozzle needs to be changed, the operator can see what needs to be done and make the necessary adjustments.

While handheld spot-pattern strobe lights are becoming an established tool in a growing number of paper mills for formation and processing applications, newer LED-based lights are getting a lot of attention because they combine a lot of light in a lightweight unit. Although not powerful enough to inspect far into the web, Unilux recommends



**Fig. 6:** The spot-pattern light from the Unilux Beacon shows the extent of plugging in the return rolls

## Uniform Vibration

Mill managers and engineers are taking a closer look at the power of spot-pattern strobes to make sure vibration settings are uniform across the web in the wet end. Having a strobe with the capability of brightly lighting the center of the web enables machine operators to see the exact detail in stock jumps to know if vibrations are out of sync in one part of the web. Again, the strobe light enables them to use their experience and knowledge of the process to determine the necessary adjustments needed to restore uniformity. This can be especially critical on wide machines. Even though bright light is one of the most important factors in a spot-pattern strobe light, mill managers should be aware that proper light temperature, 4300 K in most cases, makes machine operators more effective in their inspection duties. This “daylight” temperature simulates daylight conditions and provides better viewing with less operator fatigue. And less fatigue should result in having a sharper eye on the job for the shift.

pulsed LED lights for preventive maintenance and troubleshooting applications, for which their power and compact size are better suited. Maintenance personnel report that they can take the lights, which fit into a shirt pocket, into areas under the machines to check the conditions of flexible couplings, fans, gearboxes and motor shafts. One maintenance worker reports that when he hears or sees a problem, he can simply pull the light out of his pocket and easily check the suspected problem. Strobe lights are a highly valued inspection tool in many paper mills. And with their ability to focus light on a small but distant area of the web, spot-pattern strobe lights have raised their value in the forming stage of the papermaking process.

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