The slitter-rewinder series

Slitter rewinders – A checklist for the diligent buyer

"The more stringent the quality standards of your customer, the more is the need for a quality machine from a reputed manufacturer."

Biku Kohli

#3 – Quality

It cannot be emphasized enough how important the quality aspect is on slitter rewinders. It would not be an exaggeration to state that when your supplied finished reel unwinds on the packaging machine of the brand owner, so does the image of your company.

Key quality parameters on converting slitters include cutting accuracy/finish, winding accuracy/finish, reel tightness, and residual static levels. The importance attached to each parameter would depend on the application, with some special applications also requiring additional criteria for smooth and unconditional acceptance by the customer.

There are many design considerations and features responsible for achieving each quality parameter and as such, the more stringent the quality standards of your customer, the more is the need for a quality machine from a reputed manufacturer.

The DRM REV series doctoring rewinding machine, smallest machine in SP Ultraflex's range of converting slitters and rewinders

#4 – Output

"Traditional converting slitters are able to run at top speed for a small fraction of the total time, making them inherently inefficient."

The output of a converting slitter depends on speed; ramp times; reel changeover time; and, job changeover time. Like any converting machine, a slitter rewinder with a higher speed would yield a higher output. However, the relationship between speed and output here is not nearly as pro-rata as is the case with printing and lamination machines.

Reason? Traditional converting Slitters are able to run at top speed for a small fraction of the total time, making them inherently inefficient. The majority of the time is accounted for by ramping up and down, reel changeovers, and job changeovers. Therefore, any initiative to increase the output would be far from rewarding if they do not also include these areas.

Given the shorter job length in the slitting operation, ramp times need to be kept at minimal levels to maximize the time for which the machine runs at full-rated speed. Reducing ramp times requires a faster response from the motors in order to maintain web tension levels. This in turn requires better drives and control systems that are cut to the task.

For any length of time, Rewind Changeover Time = Changeover Frequency x Changeover Cycle Time. As compared to other converting machines, Rewind

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Changeover Times consume by far the maximum time on converting Slitter Rewinders, when viewed as a percentage of the total time. Why? First, the Changeover Frequency is much higher due to shorter reel lengths and higher speeds.

Second, is the need to changeover not one but multiple coils, which increases the Changeover Cycle Time. Dual Turret Slitter Rewinders are able to minimize Rewind Changeover Times by using two pairs of rewind shafts mounted on their respective turrets. On these machines, activities related to rewind changeovers such as finished reels taping and ejection followed by fresh core taping and positioning are carried out on the free pair of shafts even as the machine continues to slit and rewind on the engaged pair of shafts.

Apart from reducing the changeover time, this parallel mode of operation also results in the changeover cycle time for typical jobs being fixed, thereby introducing an element of uniformity in operator efficiency and making output levels repeatable and more predictable. From the above explanation of dual turret technology, it is obvious that the difference in output levels between Duplex and Dual Turret Slitters would be more when the reel lengths are shorter and/or speeds are higher (thereby increasing the Changeover Frequency) and/or the number of coils are higher (thereby increasing the Changeover Cycle Time). Any reputed manufacturer would be happy to share a productivity comparison between their Duplex and Dual Turret options for your specific job mix, thereby providing a sound basis to make the differential price/benefit analysis and take a call accordingly.

Unwind changeovers are less frequent and hence less significant when it comes to output levels. Features to reduce unwind changeover time include shaftless unwinds, splice tables, web clamps, and integrated floor lifts.

Job changeovers in converting slitters are essentially about aligning the unwind, cutting, and rewind sections to a new package design and these entail manual set-up activities in the three sections. More advanced machines are equipped with servo positioning mechanisms – either laser beams or pick and place type, to facilitate positioning of the unwind guide, cutters, and rewind cores. Since this level of automation comes at a substantial cost, one would do well to carry out a cost-benefit analysis. Automatic job set-up is usually found to be feasible when the frequency of job change, number of coils, and/or the cost attached to setup wastage (due to operator error) is reasonably high.

One can ill afford a bottleneck in slitting operations, by which point all the material- substrates, ink, and adhesive as also the cost of upstream processes have been built into the inventory and the customer is breathing heavily down the converter's neck. In order to prevent such a scenario, slitting capacity should be planned between 30% and 50% in excess of the plant's installed capacity to produce laminates. The one-time incremental investment in slitting equipment would be far less than the payback received for all times to come from smooth and uninterrupted dispatches (read smooth and uninterrupted cash flow).