

The Kusters Swimming Roll as an Integral Part for Machine Calenders

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For a number of machine components in paper and board machines the Kusters Swimming Roll has proven to be an integral part. One of these components is the machine calender.

The design and the functioning of the Swimming Roll is clear to the key people of the paper and board industry in India. It is a roll that takes care of deflection wherever deflection is in the way of producing salable and usable goods.

How is the Kusters Swimming Roll best employed in machine calenders? There are several types of machine calenders. In the so-called dead roll weight calender, the linear pressure is brought about by the weight of the rolls that act onto the bottom roll and the linear pressure can be changed by varying the number of rolls above the bottom roll.

The Swimming Roll in calenders of this type is applied as a bottom roll where it takes care of the deflection under changing loading conditions.

The second form of a machine calender is the loaded stack. Here, in addition to the roller weight an additional external load is applied by hydraulic or pneumatic pressure devices that act on the top roll. In

such calenders it will be necessary to use a bottom and a top Swimming Roll, in order to obtain a uniform linear pressure distribution through all nips of the calender stack.

The third basic form of machine calenders is the 2-roll calender, and we can say that as early as 1963 we converted a multiple roll dead weight roller stack into a loaded 2-roll stack.

There are, of course, variations and recently machine calenders with more than 2 Swimming Rolls have been built. What has been done here can briefly be called the building of two machine calenders into one.

In all these machine calenders uniform nip pressure can be brought about by adjusting the oil pressure inside the Swimming Roll in relation to the number of rolls that act on the Swimming Roll or in relation to the pressure as it is supplied by the external loading cylinders. In addition, plus or minus corrections can be made as they might be required to control sheet characteristics. From the numerous publications that have been made since 1963 the following is summarized:

- a) The smaller diameter of the Swimming Roll as-compared to a conventional roll gives a higher specific nip pressure under the same load.
- b) The smaller Swimming Roll is less in weight and can be handled with more ease.
- c) The Swimming Roll is a cylindrical roll and in a machine stack where the S-Roll is applied properly, all rolls are cylindrical rolls. The advantages are clear: less wear and less maintenance and easier grinding.
- d) The cylindrical Swimming Roll does not give circumferential speed differentials as a cambered conventional roll does. Thus, the web runs smoothly through the machine.
- e) The Swimming Roll can be adapted properly within the pressure range for which it has been designed to any working conditions and it is an excellent tool for duplicating previous working conditions precisely.
- f) Since the oil for the pressure built-up in the Swimming Roll is circulated in the system, it is a good tool for roll surface temperature control.

Often the question has come up as to why the Swimming Roll has been employed in machine calenders first. It would have been more logical to employ the Swimming Roll at a point where the sheet can be influenced more than in the machine calender.

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This might be true. But it should be realized that the paper roll at the end of paper machine is a good indicator for a properly manufactured sheet and printers have often refused to print on certain sections of a paper reel, since they showed more deficiencies than other reel sections.

Thus, it can very well be maintained that it is very easy to find out the effect of the Swimming Roll in a machine calender.

Here a few reactions from paper makers after the installation of the Swimming Roll into machine calenders :

"We produce a variety of grades, such as Newsprint, Bulky Printing and Pocket Book Paper", says a Swedish Paper Maker. "Before we installed the Kusters Swimming Rolls we had to re-arrange the whole machine calender, since one paper grade had to be calendered with ten rolls, whereas other grades required two rolls only. Thus, the camber of the 'conventional bottom roll was never correct.

Today, after we have installed the

Kusters Swimming Roll, we can lift the rolls as required adjust the inside pressure of the Swimming Roll according to the respective roller weight and continue to operate the machine calender.

Previously there were about 10 hours required for re-arranging the calender when we changed the paper grade, today we do not require more than one hour for changing a paper grade.

Generally, it can be said, that on those machines into which we have installed Swimming Rolls, we can now run an essentially better paper web over a longer period of time, and that we can do without the air blowers we used to employ previously.....".

From an American publication is the following quote :

.....We have now in all 4 machines 254" and 278" wide Swimming Rolls as bottom rolls, in the four machine calenders. The advantages are definite.

The Swimming Roll gives us the

possibility to run from 7 to 4 or even to 2 nips with far less rejects through transit qualities.

The time to arrive at a good reel after longer standstills through felt and wire changes is much shorter than previously.

Our rejects are 27% less than what they used to be.

For the Indian paper and board maker the Kusters Swimming Roll will prove to be an excellent tool, since it will help him to overcome some of the problems that result from the extremely severe working conditions prevailing in India. We realize that what can be done for the Indian paper and board industry should be done from local resources, and we know why this should be so.

On the other hand, we should likewise realize that there is no "splendid isolation". The Indian market should not be closed against the import of devices and machines and machine components that cannot be made locally for some reason or other, and which are absolutely necessary for further developments.