

Abstract

Warping is necessary for the production of woven fabrics. The process is carried out to prepare the sheet of several hundred or thousands of yarns wound parallel on a device called beam. There are many systems of preparing the parallel sheet of yarns but for apparel materials mainly direct and sectional warping systems are preferred. Direct warping is used for preparing warp beam meant for mass production and at the same time the entire warp sheet is single colored. On the other hand sectional warping is used for patterned warp mainly in a comparatively smaller lot. So one has to select either of the system depending upon the type of warp under preparation. There are not many attempts to provide a solution for the same. Most of the textile mill production units have diverse needs of producing all types of fabric varieties so they have to equip themselves with both kinds of warping systems.

In the work presented here three attempts have been made to provide a design solution to unify both systems of warping. A novel design of beam has been made with several modifications in the barrel. The newly designed barrel is made up of two parts viz. inner barrel and outer barrel. Also there are several separator plates provided throughout the width of the beam. With the help of this design it is now possible to make width adjustments for various sections. Also a provision has been made to adjust the width of first and the last section separately as they contain selvedge threads. The 2D design is also converted in to 3D design with motion simulation. The calculations for several width adjustments and corresponding maximum number of ends in a section for given value of ends per inch have been worked out. It is possible to accommodate most of the situations which exist currently in an actual mill working.

Out of three design attempts made, one design has been used to prepare prototype model using 3D printer which shows the working of the whole system in a miniature version. Thus the newly designed beam can be used on a normal warping machine when it is required to use patterned warp. Same direct warping machine can be used to prepare the beams with single colored warp in the usual way.