CHAPTER - I

1 INTRODUCTION

The increasing competition in the textile industry calls for an increase in the productivity and fabric quality. The reduction in down time of the loom is mainly dependent on the yarn quality and removal of yarn results. The modern high speed weaving machine demands exceptional yarn quality and preparation.

Ring spinning inevitably involves the production of short lengths of yarn (bobbin). The Textile Industry needs maximum possible length of fault free yarn at every stage during processing. Automatic winding machines wind the yarn into usable from many bobbin forming one wound package. The automatic winding machine, in addition, serves as a '100% yarn inspector'. Thick and thin places in the yarn are eliminated. However, at every clearer cut or yarn break, as well as at each bobbin change, a new yarn joint is required.
Depending on the type of yarn and fabric, the yarns must be joined together by either a Fisherman's or Weaver's knot. The volume and bulkiness of the knot leads to malfunctions and faults at subsequent processes. The major problems are:

i) Thickness of the fisherman's knot is 3-4 times and that of the weaver's knot is 2-3 times more than the yarn itself. Bulkiness of the knot and the knot tails are friction points during over-end withdrawal of the yarn from the package; yarn layers may be dragged along.

ii) Knots in a yarn running at high speed through a tensioner (e.g. a disc tensioner) give peak tension which can lead to yarn breakage.

iii) Weaving knot in lively yarn is opened in the tensioner during rewinding.

iv) Weaver's knot do not withstand the alternating stresses on the warp yarn in the loom. The knots especially in plied yarn slip. Plied wool yarns therefore require fisherman's knot.
v) knots and knot tails rub on neighbouring ends in the high density woven fabrics hamper the shed formation, strike against the reed and cause yarn breaks.

vi) The mass of knot disturbs the weft insertion on the air jet loom. This results in costly stoppages and quality faults.

vii) The close reed setting in the terry cloth may cause a knot on the plied yarn to spring back in front of the reed and retract the formed loop. This results in fabric fault.

viii) In knitting the knot causes problems when passing through the needle. The results are holes, dropped stitches and needle breaks.

ix) Yarn breaks and quality faults may occur on the tufting machine when the knot passes through the needle and is pushed through the backing fabric.

x) The problems with knots during shearing and mending of cloth is obviously due to its thickness, bulkiness and volume.

In the conventional joining of yarn a high degree of yarn quality is impossible as the knot itself is objectionable due to:
(i) the physical dimension of the knot is unacceptable in the cloth.

(ii) knot gives problem during mechanical processing.

The knots are responsible for 30 to 60% of stoppages in weaving and also in burling of woven pieces.

Splicing has eliminated the problems of knot. It is universally acceptable and functionally reliable.

Once it is significant that the knot renowned as a symbol of strength, reliability and security of production and quality in weaving and knitting has to give way to a still better yarn joint, the splice. This is in spite of the fact that the tensile strength of the yarn with knot is superior to that of yarn with splice.

Splicing as a technique of joining two yarn ends is an ideal alternative to knot. In addition, splicing enables a higher degree of yarn clearing to be obtained on the electronic yarn clearer. Splicing technology has grown so rapidly in the recent past that automatic knotters on modern high speed winding machine are a thing of the past.

The advantages of the spliced joint are adequate strength and a diameter nearly equal to the yarn with practically no thickening. There are no protruding ends and
no knot effects. The spliced yarn can be processed with less trouble in the various stages of the textile production and the fault frequency in the finished fabric is reduced.

Splicing is primarily a method of joining two yarn ends by intermingling the constituent fibres so that the joint is not significantly different in appearance and mechanical properties with respect to the parent yarn. The effectiveness of splicing is primarily dependent on the tensile strength and physical appearance.

Many techniques for splicing have been developed, but pneumatic splicing is the most popular amongst them. Though splicing is accepted by and large in the textile industry not much work has been done on the structure of the splice and the effectiveness of splice during mechanical processing. Not much published information is available regarding the effectiveness of the spliced yarn spun from different fibres on different spinning systems.

Aim of Work:

(i) To investigate the structure of splice.
(ii) To study the effectiveness of the spliced yarn made from different fibres, their blends on different spinning systems.