

THE INFLUENCE OF SPUN YARNS ON NEEDLE LIFE



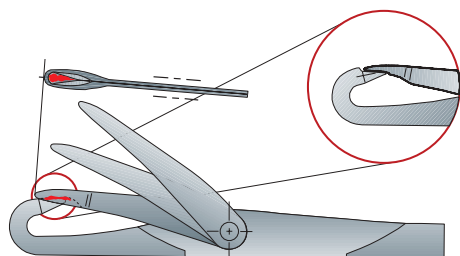
Spun yarns are produced from chemical or natural fibres. Under certain conditions, needle wear problems can occur when using either of these yarn types. Some chemical fibres contain matting agents such as titanium dioxide which can induce needle wear. Natural fibres containing foreign particles (Fig.1) exercise a similar effect. Depending on where they are cultivated, the harvesting method, weather conditions and gin treatment (cleaning process after harvesting), for example, cotton fibres can contain varying degrees of impurity. Some cotton is contaminated

by sand dust which is not eliminated by the preparations for spinning and during the spinning process itself. The inevitable result is wear, not only of needles, but also of yarn carriers, sinkers and cams. The abrasive effect can be minimized by careful selection of raw materials and intensive purification and dust removal during preparation for spinning and during the spinning process.

The position of the abrasive particles in the yarn is of decisive importance in determining the degree of wear. A particle attached to the surface of the yarn will clearly exercise the most serious abrasive effect. Yarns manufactured using the OE spinning method tend to demonstrate a greater degree of dust on the yarn surface. Where particles such as oxides or silicates (Fig.2), which are harder than needle steel, are carried on the surface of the spun yarn, the needle surface will become scratched, inevitably resulting in abrasion of the needle material.

TYPICAL NEEDLE WEAR CHARACTERISTICS

WEAR ON NEEDLE HOOK AND LATCH GROOVE



Abrasive particles accumulate at the points marked in red. In this example these are the latch groove and the hook. With every closing movement the latch hits the hook. As a result of the applied pressure and the friction, the needle steel is worn by the particles as illustrated below.

Hook



NEW HOOK



WORN HOOKS

Consequences:

- Needle lines
- Torn fibres and threads
- Holes in the fabric
- Held loops
- Tuck stitches / double stitches
- Spliced threads

Latch spoon



NEW LATCH

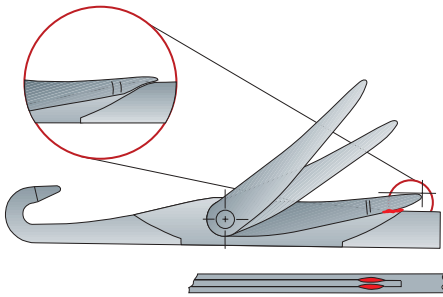


WORN LATCH

Consequences:

- Needle lines
- Holes in the fabric
- Partially cut fibres and threads
- Latch spoon breakage

WEAR ON THE BACK OF THE LATCH AND LATCH SEAT



The same effect is incurred when the latch opens and impacts the latch seat. Any abrasive particles located between the latch and the latch seat lead to the abrasion phenomena illustrated below.

Back of latch



NEW LATCH



DUE TO WEAR OF THE LATCH GUIDANCE, INCREASED LATERAL LATCH PLAY

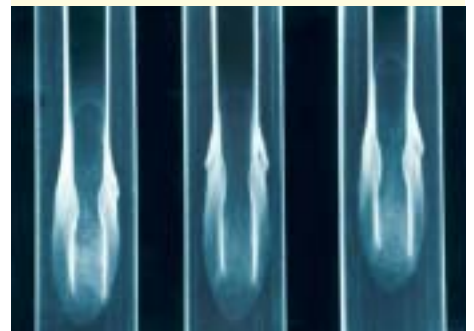
Consequences:

- Needle lines
- Tuck stitches / double stitches
- Held loops
- Spliced threads
- Partially cutting of fibres and threads

Latch seat



NEW LATCH SEAT

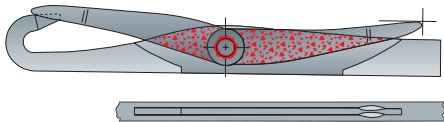


WORN LATCH SEAT RESULTING IN LOWER LATCH STANDING HEIGHT

Consequences:

- Needle lines
- Tuck stitches / double stitches
- Spliced threads

WEAR ON LATCH GUIDANCE AND LATCH BEARING

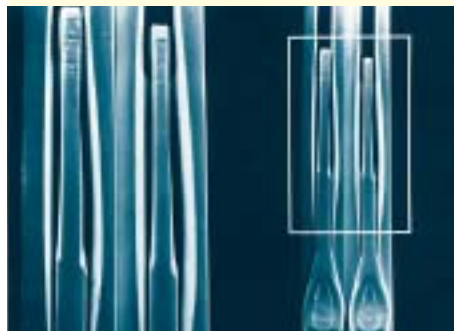


Dirt particles are also able to gain access to the slot between the latch shank and the cheek, and also between the rivet and the latch hole. The combined action of the latch movement and the abrasive particles create the material removal effect shown below.

Latch guidance



NEW NEEDLE



WORN INSIDE CHEEK WALLS AND SIDES OF THE LATCH SHANK RESULTING IN POOR LATCH GUIDANCE

Consequences:

- Wear at the lateral edge of the latch groove
- Partial cutting of threads
- Holes in the fabric
- Needle lines
- Latch drop-out

Latch bearing



NEW NEEDLE



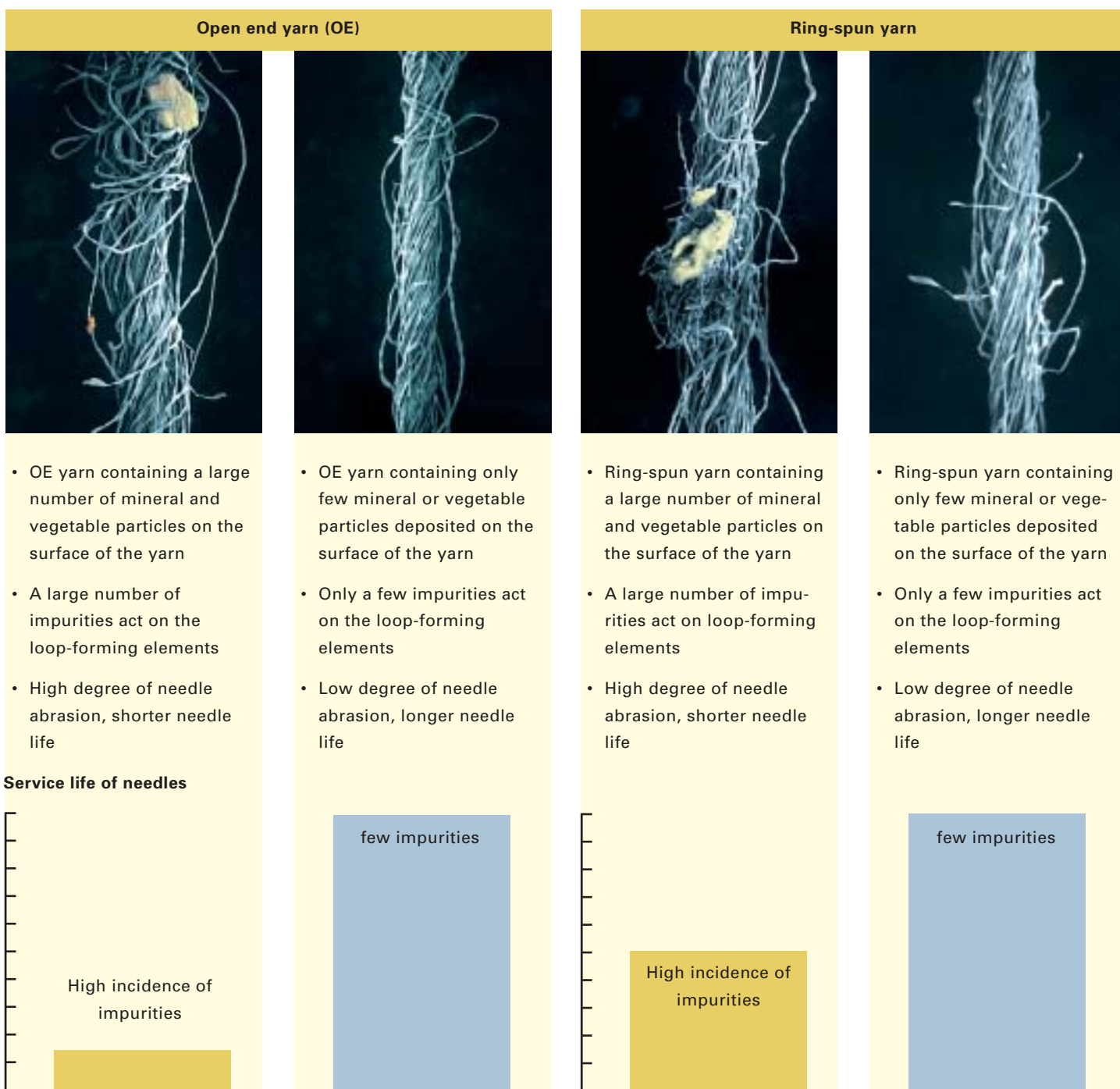
WORN LATCH HOLE, LATCH SHANK AND RIVET

Consequences:

- Needle lines
- Tuck stitches
- Latch hole breakage
- Latch drop out

COMPARISON OF SPINNING METHODS EFFECTS OF YARN IMPURITY

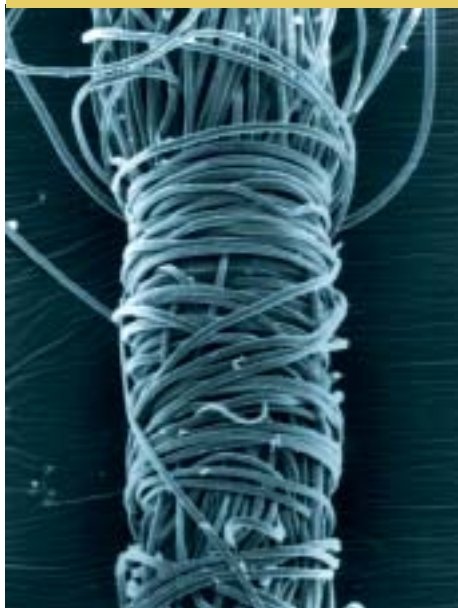
In the manufacture of cotton yarns, depending on the time and trouble invested in the preparations for spinning (for example by executing an intensive carding process or an additional combing process), it is possible to substantially improve the degree of purity as regards abrasion-inducing particles. Certainly the OE method permits the reduction of processes and the use of a higher contaminated cotton with a shorter staple length with the result that these yarns create a higher wear.



YARN STRUCTURE AND SPINNING METHODS

YARN STRUCTURE

Yarn structure OE-yarn



Results:

- Greater transfer vibration of the needle
- Unsteady needle action
- Greater friction on the needle
- Greater contact pressure of the yarn and the stitch on the needle

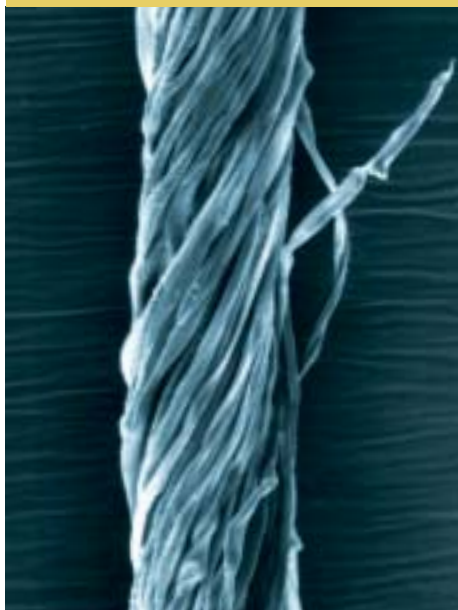
→ **Tendency towards greater needle wear**

→ **shorter needle life.**

UNTIDY LENGTHWAYS AND CROSS-WAYS NEEDLE PATTERN WITH WRAPPING FIBRES (BELLY BANDS)

High productivity due to high spinning speed, fewer work stages, therefore lower manufacturing costs

Yarn structure Ring spun Yarn



Results:

- Less marked transfer vibration acting on the needle
- Smoother needle action
- Lower friction on the needle
- Lower contact pressure of the yarn and the stitch on the needle

→ **Tendency towards lesser needle wear**

→ **and longer needle life**

FIBRE PATTERN SMOOTH AND PARALLEL

Lower productivity due to lower spinning speed, greater number of work stages, resulting in higher manufacturing costs.

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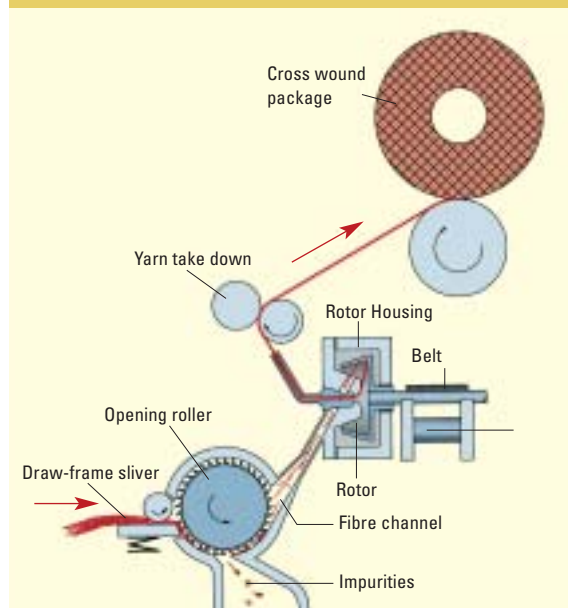
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SPINNING METHOD

Open end spinning process



Ring spinning process

