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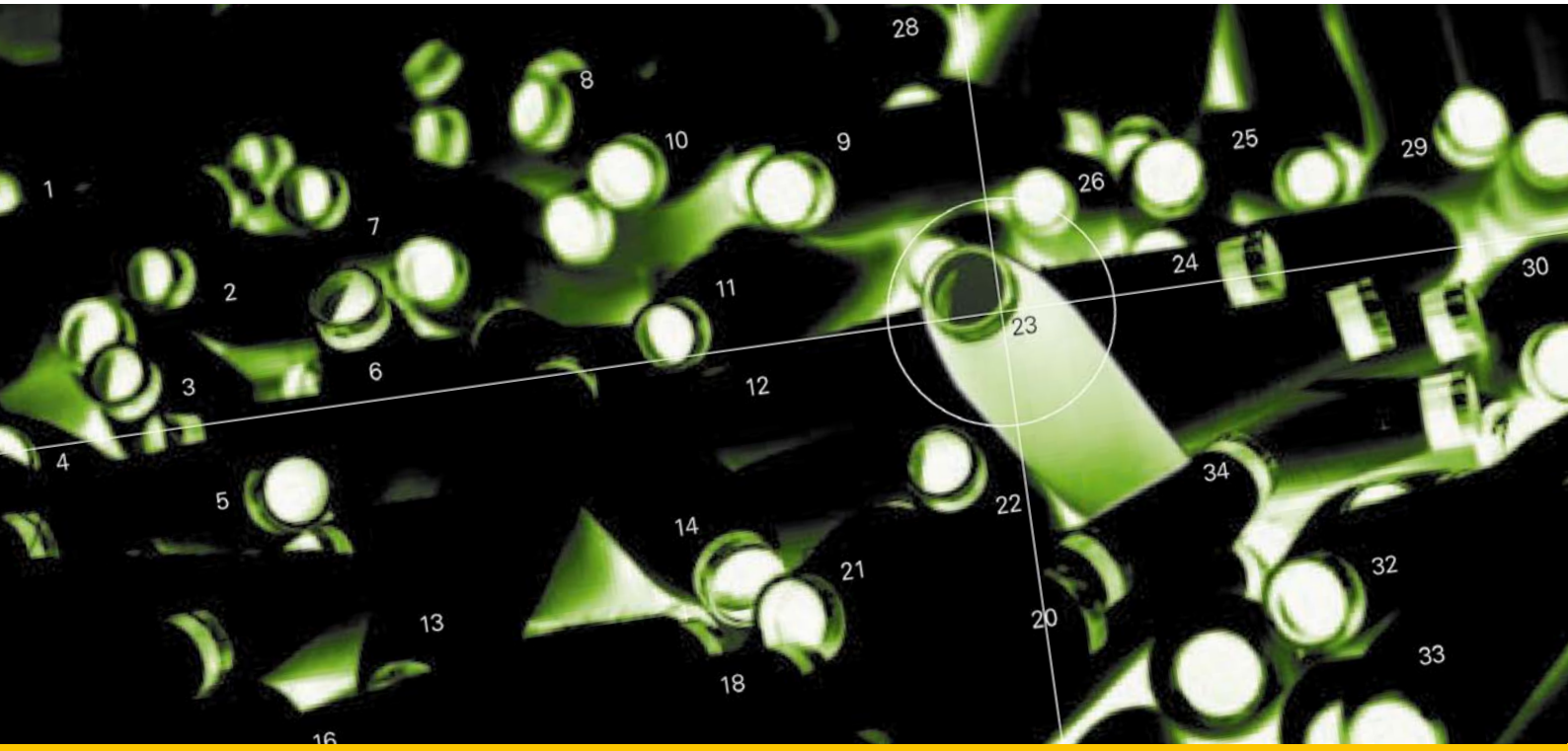

FACTS

CLASSIFICATION OF YARN FAULTS AND SPLICES

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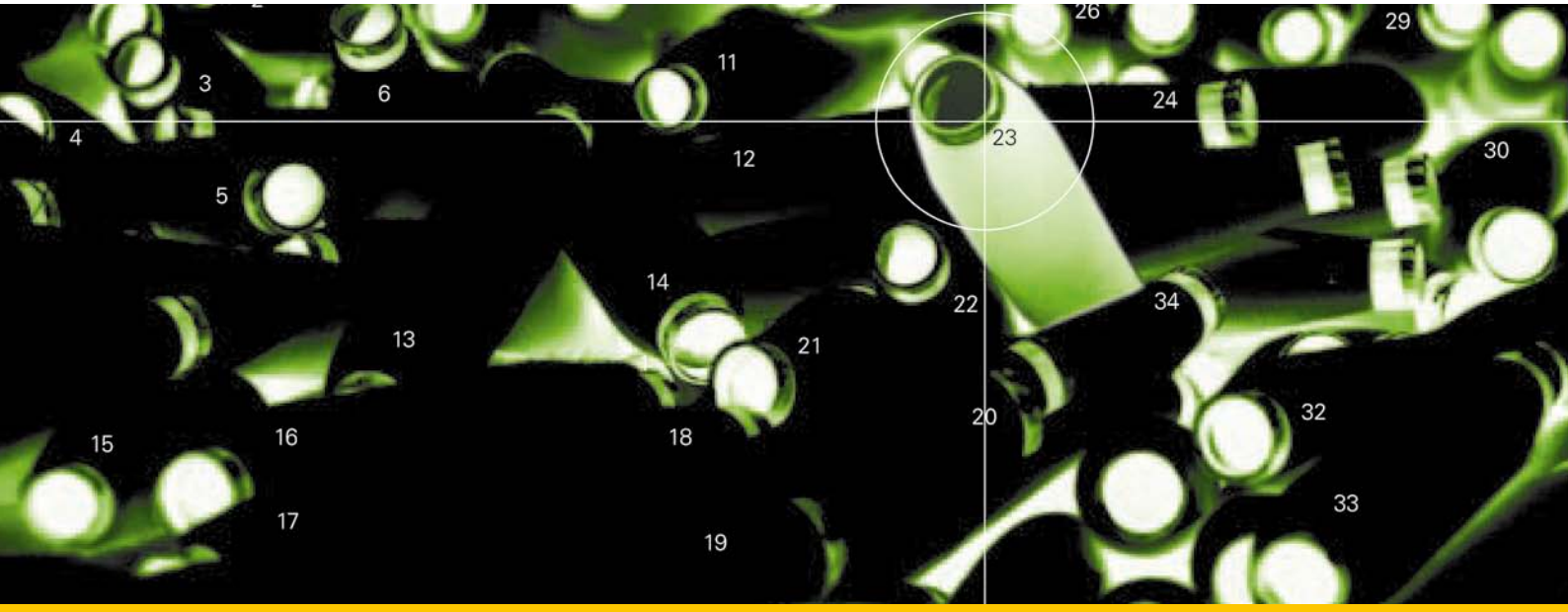


CLASSIFICATION OF YARN FAULTS

YARNMASTER®
DIGITAL ONLINE QUALITY CONTROL

The textile industry generally uses a crosswound cone, cylindrical or conical, in all processes involving yarns where the following factors determine the overall quality:

- Yarn quality
- Cone design quality (cone density)
- Yarn joining quality (splice).

The fault-free thread length of the cone should be as long as possible because every unnecessary or additional yarn join can present a problem in downstream processing.

Conventional yarn clearing, the so-called channel clearing in the winding mill, covers detection and clearance of rare yarn faults as well as monitoring the appearance of a yarn join. This serves to monitor and ensure the yarn quality demanded by the customer.

The classification of cut and non-disturbing yarn irregularities provides the quality assurance of the winding mill additional information on the type and number of faults in the yarn. These results contain important information on the production process and support optimization of the process.

CLASSIFICATION DATA

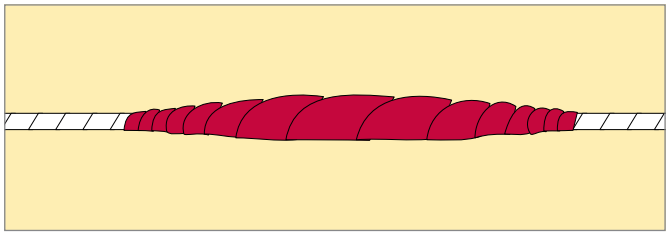
Yarn faults

Rare yarn faults are principally characterized according to their appearance. There are two different types of faults:

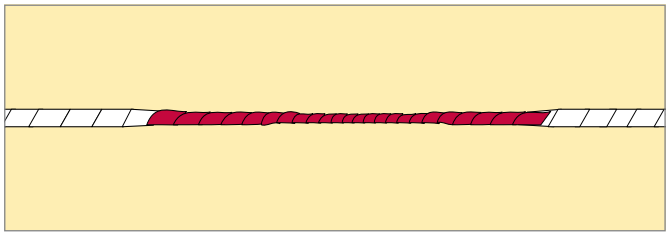
Thick places are often caused by soiling or damaged machine parts.

Thin places can occur, for example, through excessive drafts in the drafting assembly.

Around half of all thick places are caused by fiber fly spun in on the spinning machine. Many of these faults can be avoided by keeping the spinning machine clean as well as using optimized settings.



Thick place



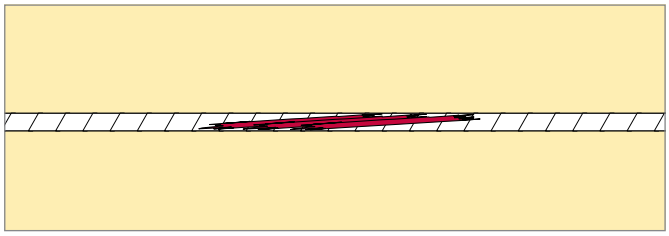
Thin place

Splices

To ensure yarn joins do not interrupt downstream processing, their quality characteristics must not only include adequate tensile strength and elongation but also an excellent appearance.

In the perfect case, the diameter of a splice matches the yarn diameter. The quality spinner sets the largest allowable yarn fault as the upper limit for the splice diameter. Splices must not be larger than the cleared yarn faults.

This illustrates the close relation between splice size and yarn clearing setting: Only a quasi "invisible" splice, meaning a splice matching the yarn, allows a tight clearer setting otherwise small yarn faults could possibly be replaced by larger splices.



Splice

YARN*MASTER*®
DIGITAL ONLINE QUALITY CONTROL

→ Definition

Yarn faults and splices are defined based on their length and width. The length is specified in centimeters and the width as multiple of the normal diameter of a yarn.

It is advantageous to use a rectangular coordinate system to represent rare yarn faults in length and diameter. The lengths are shown on the horizontal axis (X axis) and the diameters on the vertical axis (Y axis).

Every yarn fault can be entered as a point in the coordinate level as shown in *Figure 1*.

CLASSIFICATION

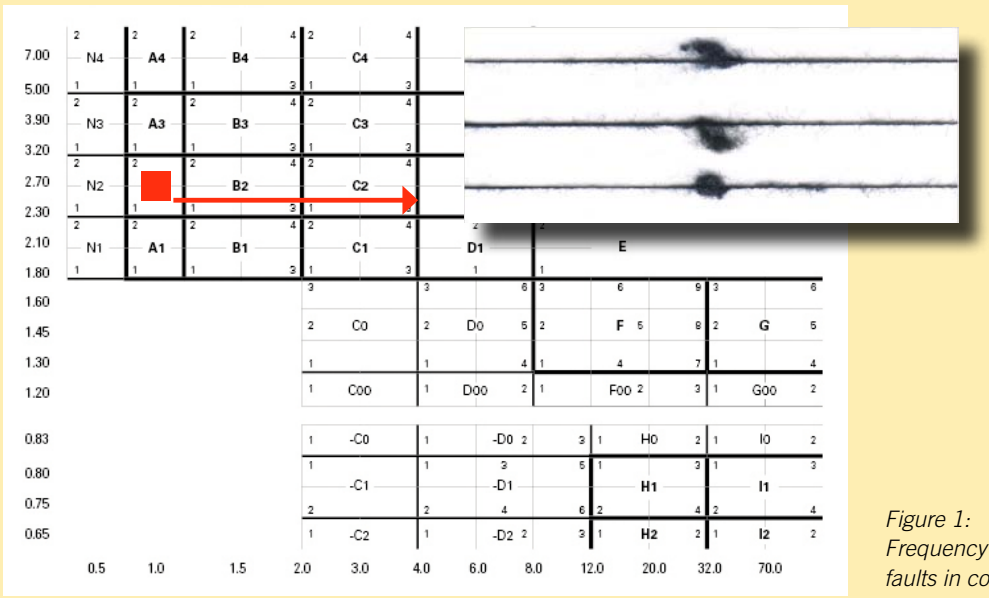


Figure 1:
Frequency distribution of yarn faults in coordinate network

➜ Yarn fault classification

When viewing the coordinate system, one can recognize areas that relate to the following fault types as shown in *Figure 2:*

- Neps
- Short thick places
- Long faults and double threads
- Thin places

LOEPFE uses the classification setting in addition to the conventional channel setting to improve setting options.
Every field of the classification setting can be activated individually.

Figure 3 shows the yarn clearing performed according to channels and classes.

PRINCIPLES

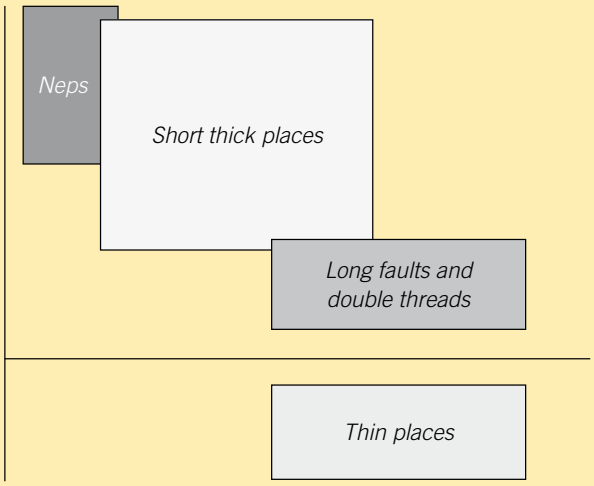


Figure 2:
Channels and classes

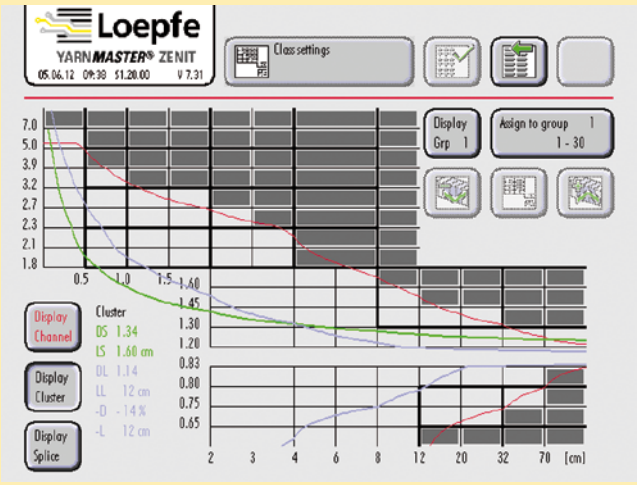


Figure 3:
Combined channel and class clearing

Yarn fault classification process

During close examination of a yarn fault, one can see that it changes in the length. *Figure 4* shows a thick place made up of different thickenings.

After the clearing limit in *Figure 5* is exceeded, the "combination fault" shown in *Figure 4* is cut and characterized as a short fault. Information on the actual type of the fault is lost with this method.

Using the classification method, this "combination fault" is first characterized as such after it has completely passed the sensing head measuring field. The yarn fault is therefore assigned conditionally to the long fault class. The differing widths of the long fault are calculated to a mean value. This means the average thickening is smaller relative to the largest width of the yarn fault *Figure 6*.

Figure 4:
Representation of a long fault

Figure 5:
Clearing limit set for short faults

Figure 6:
Classification of the "combination fault"

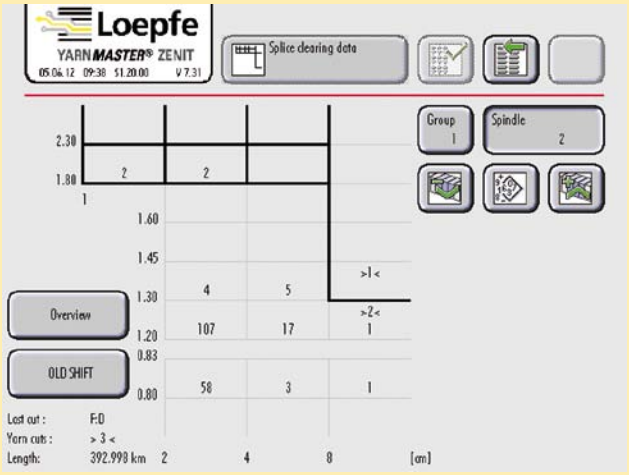


Figure 7:
YarnMaster® splice classification

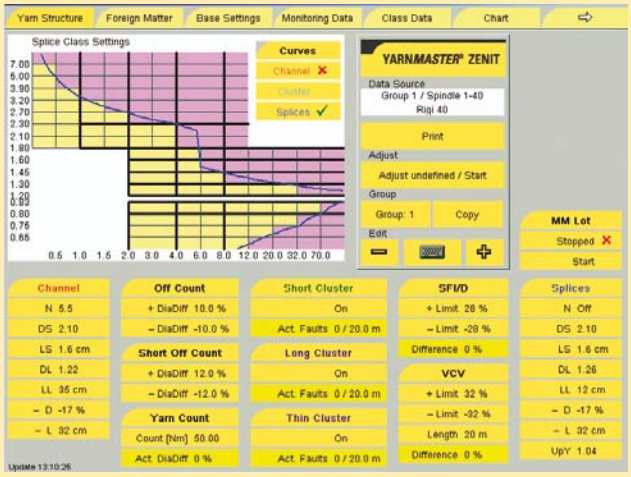


Figure 8:
YarnMaster® splice class clearing

SPLICE CLASSIFICATION

➜ In the perfect case, the diameter of a splice should be the same as the yarn diameter. For this reason, splice classification in the YarnMaster® Zenit system is based on a finer class field outside the normal class range for yarn faults as shown in *Figure 7.*

Demands on splice quality have risen since the introduction of the compact spinning process on the market. Significant improvements in tensile strength and elongation values as well as low hairiness are the primary yarn characteristics as compared to conventional ring yarns. A splice clearer channel of the YarnMaster® system can meet these higher quality demands here.

➜ **Splice class clearing**

Splice clearing according to classes opens up the splice detection option of a completely optional clearer characteristic even without the splice curve.

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