

Material Damage and Needle Selection

Read the fibre ends. Name the mechanism. Know what to do next.



Approx. 25 minutes · five damage families · six field steps · four verdict classes · knowledge check

AMANN. Beyond Threads.

Why should I care?

The sewing thread is the most visible component in a seam and the cheapest one to blame. That is the whole problem — and the whole opportunity.



The value at stake is not the thread

If a seam fails, the finished goods are affected. The customer is not arguing about the price of a cone; they are arguing about a production batch.



The thread is suspected first

It carries a supplier name and it is visible in the damage. In many real cases the mechanism sits at the needle, the machine setting, the material or a downstream process.



The first answer decides the case

A vague answer invites escalation. A confident wrong answer is worse. A mechanism, plus what is still open, keeps the case technical — where it can be solved.

What changes for you

Sales

see when a complaint is not about the thread — and show it

Technical advisory

one routine and one escalation package instead of improvisation

Product management

field feedback that names a mechanism, not a suspicion

Customer service

the three questions that decide the case before a visit is booked

Five mechanisms, one method, and a boundary that protects you: the technical finding is yours, the commercial decision is not.

What will I learn?

Four objectives, and a clear line between what this module answers and what it does not.



1

Read the damage

Tell mechanical force, heat, friction and pure displacement apart from the fibre ends alone.



2

Run the routine

Six steps in the correct order, from securing the sample to a documented decision.



3

Decide the needle

Size in Nm, cloth point against cutting point, condition and the machine parameters behind needle heat.



4

Use it with the customer

Ask the questions that narrow the case, and know when a technical specialist has to take over.

What this module answers

What happened to the material, how serious and how widespread it is, what to correct on site, and what has to go to the laboratory.

What it deliberately does not answer

Who is at fault, what it costs, whether a complaint is accepted, and which product to sell instead. Stitch formation is LN-026; the complaint is LN-028.

The four levels of the Learning Suite apply: know · understand · recognise · apply. The knowledge check at the end tests recognition and application, not recall.

The fibre ends carry the mechanism

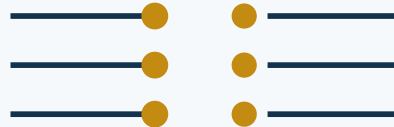
Four appearances under the linen tester, four mechanisms. This one distinction decides most cases before any measurement is taken.



Cut

MD-1 · mechanical force

Force. The needle severed the yarn.



Fused

MD-2 · heat

Heat. Thermoplastic fibres melted and re-solidified.



Frayed

MD-3 · friction

Friction. The fibre surface was opened, not cut.



Intact, displaced

MD-4 · no fibre damage

Nothing was destroyed — the yarns only moved.



MD-5 · latent damage is a timing statement, not a mechanism.

Nothing on the fresh part, holes after washing or finishing. One of the four mechanisms above is always behind it — and an unwashed reference part is the only way to find out which.

Schematic drawings, not photographs. A photographic reference set under the linen tester is listed as an open point.

Five families, five colours — used from here on

Each family has one visual signature and one first check. The colours stay identical on every following slide.


MD-1

Needle cutting damage

Cleanly cut, square ends at the penetration point. In knitwear a severed loop opens into a ladder.

FIRST CHECK

Point style · needle condition · needle size


MD-2

Needle heat damage

Fused, bead-shaped ends and a glazed hole. Appears after running time, eases after a stop.

FIRST CHECK

Speed · run time · coating and cooling


MD-3

Abrasion damage

Frayed, opened surfaces along the thread run and at contact edges, often away from the hole.

FIRST CHECK

Thread path · needle plate · hook · guides


MD-4

Structural damage

Yarns whole but displaced; elongated openings under load. No fibre substance destroyed.

FIRST CHECK

Fabric density · seam allowance · tension


MD-5

Latent damage

Nothing on the fresh part; holes after washing, laundry or finishing.

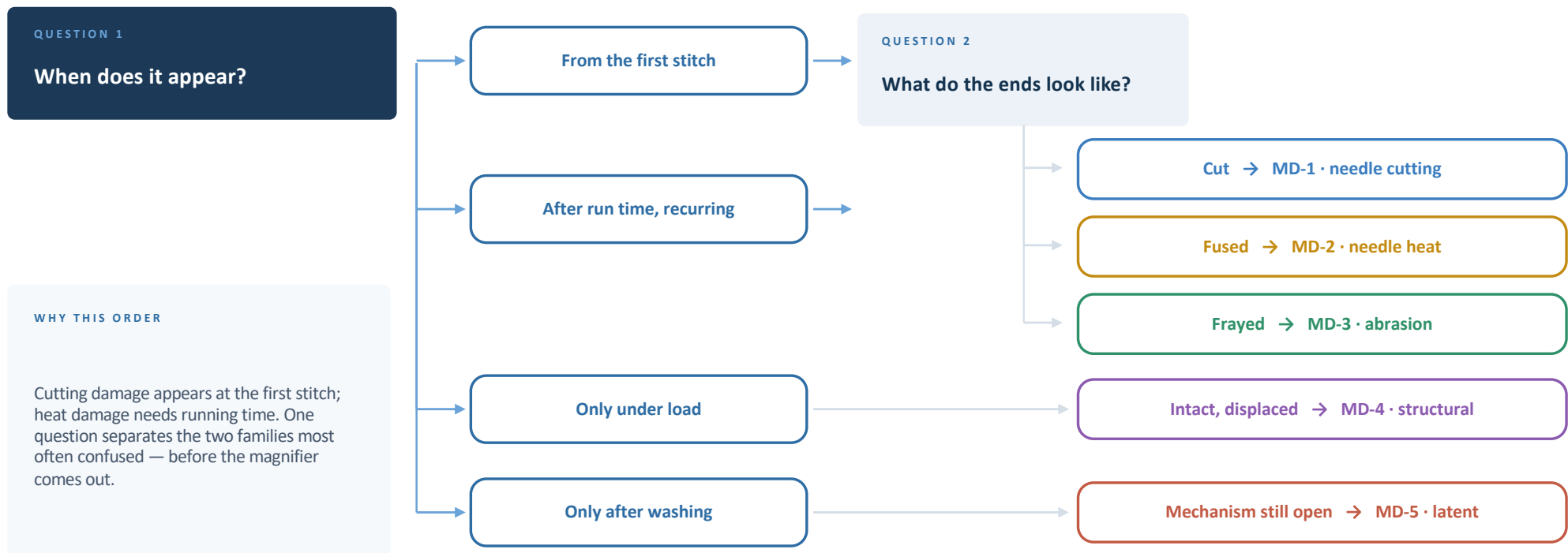
FIRST CHECK

Unwashed reference · process record

MD-4 is the most frequent false positive in the field: the customer reports a destroyed fabric, and nothing has been destroyed. Naming it correctly, magnifier in hand, is the most valuable single outcome of this module.

Two questions decide most cases

Timing first, because it is free — the operator can answer it. Then the fibre ends under the linen tester.



MD-5 is never an endpoint: it names when the damage became visible. The mechanism behind it is found on an unwashed reference part.

Six steps — each one produces what the next one needs

A sequence, not a checklist. The tools are the AMANN Field Service Toolbox items from LN-016.



Step 2 before step 3 is deliberate. “One machine or all machines?” is the single most valuable answer in the routine — and it costs nothing.

Size: what Nm says, and what it does not

The needle is the cheapest part in the process, the direct cause of MD-1, a principal cause of MD-2 and a contributor to MD-3.



← measured here,
just above the scarf

Nm 110 = 1.10 mm

The metric needle size is the diameter of the needle blade in hundredths of a millimetre. The No. / Singer numbers are relative sizes without a diameter meaning.

As thin as possible, as thick as necessary.

Needle size min — an AMANN product figure

Every AMANN product table gives a needle size min per ticket number: the smallest permitted needle for that thread size. It is a lower limit, not a recommendation — the fabric decides how far above it the correct size lies.

Product	Ticket no.	Tex no.	Needle size min
Universal	30	80	Nm 110
Serafil	30	90	Nm 100
Saba	30	105	Nm 110
Onyx	30	105	Nm 130
Mercifil	30	60	Nm 100



Saba and Onyx carry the same Tex number at ticket 30 and require different minimum needles — Nm 110 against Nm 130.

Raw material and construction change how the thread passes the needle eye. Ticket numbers are not comparable between products: read the product's own table, and confirm against the live range before quoting.

Ticket, Tex and needle figures: AMANN product documentation as consolidated for LN-024.

Geometry: displacing or cutting

There is no third behaviour. A cutting geometry on a textile fabric produces MD-1 by design — no speed, no thread and no tension setting repairs it.

Displacing — cloth points



The yarns are pushed aside and close again behind the needle.

R	chainstitch; fine, sensitive knits, microfibre
RS	lockstitch on woven, artificial leather, coated
RG	light ball point — knitwear, underwear
FFG	sharp round point — fine to very fine weaves
FG	medium ball point — elastic and elastomeric
G / SKL	coarse elastic and warp-knitted structures

Cutting — leather points



The yarn is severed. On leather that is the intent; on textile fabric it is MD-1.

S	cut parallel to the seam — very straight seam
P	cut across the seam — high-strength seam
LR / LL	45° and 135° — inclined or recessed seam
D / DI	triangular, rhombic — hard, dry leather
DH	reduced cut — laminates, heavy canvas
SD1	round with a small tip — fine leather, PVC/PUR

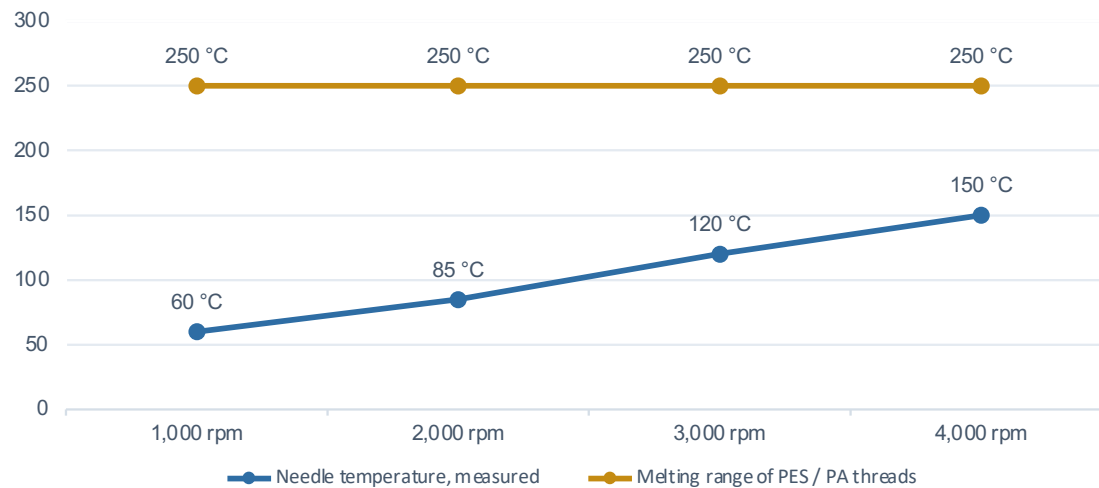


In knitted and elastane structures a cutting point severs loops, and one severed elastane filament stays visible over centimetres. Where a cutting geometry is genuinely required on a sensitive material, SD1 is the gentlest — the material decides, not the habit.

Designations follow the Groz-Beckert (cloth points) and SCHMETZ (cutting points) systems — general processing knowledge, not AMANN specifications. The needle supplier confirms the designation for the customer's machine and material.

Heat: the mechanism you steer from the panel

Measured on 100 % cotton denim in an industrial lockstitch machine. Quote the condition with the figure — never a single temperature as a limit for a customer's article.



What the curve does not show

At 4,000 rpm about 40 % of the sewing thread's tensile strength is lost, and thread properties fall away sharply above 3,000 rpm. Reported temperatures differ with the measurement method — the range, not one number, is the honest figure.

What reduces it — in order of measured effect

- Sewing speed
- Uninterrupted run time
- Material thickness and density
- Needle-thread tension
- Needle surface and coating
- Needle cooling



Coatings help but do not replace a change interval: DLC-coated needles ran 9–12 % cooler than uncoated ones and left the thread 12–14 % stronger after sewing, while the DLC layer degraded near the eye after about fifteen high-speed cycles. Titanium-nitride coated needles ran coolest overall.

Sources: needle-heating study on denim (Mazari, TU Liberec); needle-coating study (Mazari & Mazari, Coatings 15/2025, 485); melting range from seam-performance literature (Gurarda 2019).

One case, worked through

Workwear jackets, holes beside the shoulder seam. The same case handled two ways — and what each one costs.

THE SITUATION

Holes beside the shoulder seam, on one machine only, from the first stitch of the seam. The customer has stopped the line and wants an answer.

Without the method

- “Our thread is tested and certified.” — a defence, not a finding.
- A product is offered as a solution before the mechanism is known.
- The customer hears a supplier protecting itself and escalates.
- The sample is torn open by hand; the evidence is compromised.
- The case leaves the technical level and becomes a claim.

With the method

- Sample and reference secured with the seam ripper, damage marked.
- “One machine only, from the first stitch” — mapped before magnifying.
- Under the linen tester: cleanly cut, square ends at the penetration point.
- Needle pulled: a cutting point in a woven workwear fabric. MD-1.
- Point style corrected, test seam re-sewn and shown on the customer's own part.

Outcome: MD-1 · S2 functional · E2 one machine → V2 field measure. Closed on site, documented, no escalation — and the customer saw the difference instead of being told about it.

Constructed teaching case, built from the mechanisms in this module. Not a documented AMANN customer case.

What the customer actually cares about

Not the taxonomy. What the damage costs them, and whether it comes back. Their questions map onto AMANN's own seam-quality criteria.



Seam stability

Will it still hold — after washing, wearing, loading?



Seam appearance

Visible or glazed penetration points are a rejection reason even when the seam holds.



Seam abrasion resistance

A thread weakened during sewing wears out faster in use.



Care properties

Damage that appears after industrial laundering hits after delivery.



Process stability

Is the process reproducible tomorrow, or does the fault return next shift?



Productivity and cost

Stops, re-sewn parts and rejected batches are machine time, not material cost.



These are AMANN's own terms. The AMANN Knowledge Hub defines seam quality as seam stability, elongation, haptics, abrasion resistance, appearance and care properties — plus product-dependent and individual criteria. Material damage is what removes those qualities from a finished seam.

Two things a customer wants and rarely says: an answer they can pass on internally, and the certainty that the supplier is not simply defending its own product.

What an AMANN employee brings to that conversation

Three things the customer does not have: an instrument, a method, and an escalation path with a laboratory behind it.



The instrument

LN-016 Field Service Toolbox: linen tester, seam ripper, precision scissors, tweezers, stitch-density ruler, ticket cards. Routine 4 is the damage pre-assessment.



The method

Five families, six steps, three assessment axes, four verdict classes — the same procedure on every visit, in every region.



The escalation

Technical Advisory Services with laboratory methods, and a nine-item data set that turns a parcel into a specific question.

And one product fact that belongs in the conversation

The AMANN product tables give a needle size min per ticket number. It connects a thread specification to the needle decision at the customer's machine — and it shows why ticket numbers cannot be compared between products.

And one sentence you never say

No statement of fault, no monetary consequence, no acceptance or rejection of a complaint, and no assessment of a competitor's product from a sample. The technical finding is yours; the commercial decision is LN-028.

Diagnosis first, product recommendation second — never the other way round. A product proposed before the mechanism is known reads as a sales reflex.

From what the customer says to what you do next

Five columns, read left to right. The middle column is the one that has to be resisted long enough to reach the third.

CUSTOMER SAYS	WHAT IT MAY MEAN	QUESTIONS TO ASK	AMANN KNOWLEDGE	POSSIBLE NEXT STEP
"Your thread cut our fabric."	→ Either the needle severed yarns (MD-1) or nothing was severed at all (MD-4).	→ May I look at the ends under the magnifier? Which needle is in the machine?	→ Cloth points displace, cutting points cut. A cutting geometry on textile fabric damages by design.	→ Cut ends → correct the point style and verify. Intact ends → MD-4: seam construction, not thread.
"The thread keeps breaking after a while."	Time-dependent: heat (MD-2), or a burr wearing the thread (MD-3).	Does it return after a similar number of stitches? Does it ease after a stop?	Needle temperature rises with speed and run time; a burr damages from the first stitch.	Reduce speed, check needle and cooling — or inspect the thread path. Re-test.
"We only see it after washing."	Latent damage (MD-5). The mechanism is still open.	Is there an unwashed part from the same batch? What are the laundry parameters?	Latent is a timing statement. Weakened yarns, thermal pre-damage or chemistry are the three routes.	Secure the reference, collect the process data, escalate to TAS with the full data set.
"Our other supplier never had this."	A comparison claim, not a technical statement.	What exactly changed with the switch — thread size, needle, speed, fabric lot?	Ticket numbers are not comparable between products; a thread swap can change the needle requirement.	Compare the actual specifications. Never assess a competitor's product from a sample.

When to involve a technical specialist: safety-relevant or certified articles, systematic findings, an open mechanism, a required number, or a washed part with no reference.

Six mistakes that cost more than the damage

Each one is easy to make under pressure, and each has a one-line correction.



“The thread is the weakest point, so it is the cause.”

The thread is the most visible component, not the most likely cause.



Magnifying before mapping

A hypothesis formed too early gets defended. Ask which machines are affected first — it is free.



Quoting one needle temperature

Published values differ by method, fabric and machine. Give the range with its condition.



Treating latent damage as a mechanism

MD-5 says when it became visible, not how it was created.



Calling yarn slippage a material damage

If the yarns are whole, nothing was destroyed — and saying so precisely protects everyone.



Answering the commercial question first

Fault, cost and acceptance remove the technical ground the case needs.

The pattern behind all six: they replace an observation with an assumption. The method exists to slow that down by about two minutes.

Six things to remember

1 Read the ends first

Cut means force, fused means heat, frayed means friction, intact but displaced means no material damage at all.

2 Ask when, and ask where

Timing separates force from heat. “One machine or all machines?” separates a setting from a material.

3 A wrong point style cannot be compensated

No speed, thread or tension setting repairs a cutting geometry on a textile fabric.

4 Nm is a needle, not a thread

Needle size min is a lower limit per ticket number — and ticket numbers are not comparable between products.

5 Every figure with its condition

Especially needle temperature. A single number will be contradicted; a range with its condition will not.

6 Finding yours, decision theirs

The technical finding is your deliverable. Fault, cost and acceptance belong to the complaint process.

If you remember only the first one, you will still be right more often than not.

Knowledge check

Four short cases. Decide the family and the next step, then compare with the resolution on the following page of the trainer.

Case 1

A knitted polo, ladders running away from the shoulder seam, one machine, visible from the first stitch.

Which family, and what do you check first?

Case 2

Coated outdoor fabric, thread breaks return after a similar run length, and the first stitches after a stop are fine.

Which family, and which machine parameter do you look at?

Case 3

Fine lingerie fabric, seams open under load; under the magnifier the yarns are whole and full length.

Is this a material damage? What do you tell the customer?

Case 4

A shirt batch shows holes after the first industrial wash. Production found nothing at inspection.

What do you request before saying anything about the cause?



Resolutions: 1 · MD-1 — check the point style, a cutting geometry in a knitted structure severs loops. 2 · MD-2 — sewing speed and uninterrupted run time first. 3 · No. Yarns intact means MD-4, a seam-construction question, not thread damage. 4 · An unwashed reference part from the same batch, plus the laundry parameters.

The interactive field trainer contains the full assessment: twelve items, four ranks from Damage Observer to Field Diagnosis Master.

What can I do differently tomorrow?

Five actions that need no budget, no approval and no new tool.



1

Carry the linen tester and use it in front of the customer

The moment the magnifier goes on the seam, the conversation changes from opinion to observation.



2

Ask the two free questions first

When in the seam does it appear, and is it one machine or all machines?



3

Look at the needle before you look at the thread

Pull it, inspect it, compare it with a new one of the same system and size.



4

Take a reference part, every time

An undamaged part from the same batch is what makes a later assessment possible at all.



5

Write the finding as a mechanism, not as a verdict

“Cut ends at the penetration point, cutting point found in the machine” — and let the process do the rest.



Next in Learning Stream 18

LN-028 · Complaint Handling — from Claim to Trust. The seam is LN-026, the material is LN-027, the complaint is LN-028.



Go deeper

The LN-027 deep-dive document, the interactive field trainer, and the AMANN Knowledge Hub for seam quality and thread numbering.

Sources: AMANN Field Service Toolbox (LN-016) · AMANN Knowledge Hub · LN-024 product, ticket and needle data · Groz-Beckert and SCHMETZ needle documentation · Mazari (TU Liberec) · Mazari & Mazari, Coatings 15 (2025) 485 · Gurarda 2019 · Cotton Incorporated TRI-3015 · ISO, ASTM, AATCC and EN methods as named. Needle designations, geometries, temperature figures and test methods are general processing knowledge, not AMANN specifications.

Source research, technical analysis and data evaluation were carried out with the support of AI systems — among them Claude, ChatGPT and Perplexity. Every technical statement was verified against the named primary sources; the technical responsibility remains with the authors. © Loo / Fieberg · Gherzi Germany for AMANN Group · Doc. LN-027-TAS-LS18 · Version 03 · September 2026.

