Skipping and Shredding

Skipping Defined:

Skipping occurs when the hook misses the top thread loop on the backside of the needle. The needle will make an extra hole or holes in the fabric when this happens, but the stitch will be longer. This is sometimes, if not often confused with a stitch regulation issue, because the results appear very similar. The difference being that there will not be extra holes in the fabric in the middle of a long stitch when it is a stitch regulation issue.

Shredding Defined:

Shredding occurs when the hook hits or collides with the top thread loop as the hook passes the needle or when something else abrades the thread, such as damaged thread guides. Thread can wear grooves into steel guides over time. It causes damage to the top thread until the thread shreds or breaks and then skipping occurs. Occasionally the thread will actually break and re-catch itself once again and sew further. The hook point is very sharp and will damage the thread when it hits it. This causes the thread to splay or fray apart and get hit even more until it breaks. It will sometimes tie different pieces of the thread into a knot in the take-up lever hole because the thread is going back and forth through it. Thread damage is often seen on the quilt top when this happens.

How the Stitch is Formed:

The stitch is formed using the principal of friction. When the threaded needle reaches bottom-dead-center the thread is pinched against the back side of the needle above the scarf by the fabric. The back side of the needle does not have a groove like the front side of the needle. The long groove in the front of the needle protects the thread from being pinched in the front by the fabric and allows a larger loop to form in the back of the needle for the hook to catch.

At bottom dead center, the hook has not yet arrived at the needle and the top thread loop has not yet been formed. When the needle rises/lifts a little, the loop begins to form (loop lift 2.2mm on all HQ Long arms except the Infinity, which is 2.6mm). The loop forms behind the scarf of the needle with the bottom of the loop at the needle eye, located below the scarf. At the same time the rise/lift happens, the hook rotates so that it can enter and pick-up the created loop.

If the hook misses the loop then a skipped stitch occurs. No loop no stitch! If this happens one time or more than once it is called skipping or skipped stitches. The top thread loop is pulled completely around the hook assembly basket, bobbin case and bobbin, wrapping the top thread around the bobbin thread and creating a lock stitch. This is like a half knot, wrapped once around each other. At the completion of the stich ideally this half knot will be located in between the two layers of fabric, making the strongest and nicest appearing stitch.

Causes of Skipping / Shredding & Solutions (Resolving the Causes):

- **Timing** (relationship between the needle and the hook and specific adjustments that affect timing).
    - Anything that changes the relationship between the needle and the hook effectively changes the timing of the machine. When a needle is bent the timing of the machine changes. When the needle is installed incorrectly it changes timing. If the timing belt is too loose it produces inconsistent differences between the hook and the needle. If the hook shaft has axial play the needle distance between the hook will change randomly and then be inconsistent making accurate timing impossible. All of these items must be correct before the actual timing adjustments are performed.
    - There are three primary timing adjustments, which are done after the machine has been cleaned, oiled, adjusted and has correct needle position in the needle plate. These are loop lift, needle distance and needle bar height. More information is given regarding these adjustments and making sure the machine is healthy and ready to be timed in the service manuals for each machine.

- **Needle** (system, size, point, type, straightness, position, and orientation)
    - Use the correct needle system for the machine and size and point for the fabric and the thread. When a large needle is used that is too large for the fabric and the thread, it will produce too big of a hole and less friction which will affect the loop formation, no loop, no stitch. If we add a slippery fabric to the above scenario it makes it even less likely for a proper loop to form.

- The needle must be installed all the way and double checked through the stop/sight hole. The long groove and eye must be to the front with the scarf to the back, away from the user.
- The needle must be straight and can be checked by rolling it on the needle plate. If the point wobbles, then the needle is bent and should be replaced.
- The needle might be rotated slightly because of its round mounting shank and this may resolve skipping or shredding. Conversely if the needle is not installed correctly this may also be the cause of skipping or shredding.

- **Thread** (quality, size, type, twist)
  - Quality thread is more consistent, stronger, and less likely to be the cause of problems. The thread should be appropriate for the application and fabric. If the thread is too big or too little for the needle it will cause issues with loop formation and skipping or shredding. Some threads can unwind during quilting making the thread easier to be hit by the hook point causing shredding and breaking. The direction of sewing can cause the thread to unwind in some cases. This unwinding can often be seen near the thread guides, the top tension disks, as well as the take-up lever.

- **Fabric** (thickness, density, type, height of poles and tautness on the frame)
  - Some fabric is very densely woven and others very loosely woven. Keep in mind the principle of friction and how the loop is formed. The needle should match the fabric and the thread and be appropriate for the application.
  - If the fabric is too tightly wound on the frame it can open the weave of the fabric even more, cause trampolining and skipped stitches or shredding.
  - If the side arm pole supports are set too high the quilt will trampoline more and increase the chance of skipped stitches and shredding.

- **Smoothness of machine movement** (moving too fast, too slow, jerky or erratic)
  - Moving the machine too jerky, fast, slow or erratic causes significant needle displacement, changing the relationship between the needle and the hook causing issues.

- **Tensions too tight** (even if balanced)
    - If both tensions are too tight, the stitch may look great and the thread may not break; however, the thread pulling too tightly through the needle eye will displace the needle as the heavy quilting machine is moved around the quilt. This changes the relationship between the needle and the hook and therefore the timing. We have seen this cause skipping and shredding issues when all else is correct and the timing is adjusted perfectly.

- **Hopping Foot too High** (causes poor loop formation, even at low speeds)
    - If the hopping foot is too high the fabric can flag or trampoline up and down with the needle bar and the loop formation will not occur properly. This may happen at only slower speeds or not at all speeds. Thus, it is recommended to sew off and check machines after repair through the full speed spectrum. Unfortunately, the end user may see the nut on the hopping foot or mount and adjust the hopping foot height for thicker quilts, not realizing they can simply push up on the spring-loaded presser bar to accommodate the quilt.

- **Speed** (We have found that needle deflection occurs more at higher speeds)
    - We recommend the Handi Quilter High Speed Needles (MR) when sewing 2000 SPM and faster.
    - These needles minimize the needle deflection when the machine is pushed away from you.
    - High speed needles will work on any Handi Quilter machine; if the machine is adjusted correctly for regular needles it will also work well with a high speed needle. If the machine is adjusted a little incorrectly then the issue may be magnified with high speed needles.

- **Direction of machine movement** (quilting is a multidirectional application)
    - The quilting process has unique issues because quilting is a multi-directional operation and because one can move the machine at any time during the stich formation cycle. As the direction of the machine is changed during quilting, the

fabric can move or displace the needle, changing its relationship to the hook and therefore the timing. This is usually noticed most while quilting from left to right, from bottom right-hand to top left-hand side or while quilting clockwise from 8-12 o-clock. Frequently skipped stitches will be seen most during these operations. Another time is when one pushes the machine away from them, which causes the fabric to push the needle away from the hook increasing needle distance between the needle and the hook. Not only will these operations cause skipped stiches but they also often cause shredding or as we affectionately call it, the “dreaded shredded”. Resolve this by making sure all of the above are done and that timing is correct.