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Experimental Analysis of Static Thread Fusing When the Machine Stops

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Description

Investigate the impact on seam appearance due to fabric weight, bending rigidity and static thread tensions at single needle lock stitch sewing machine. The intersection among the stated parameters is crucial at stitched fabric to predict seam appearance. Sixteen different weights of fabrics are investigated at fixed foot pressure, needle diameter, bobbin thread tension to explore the effect of intersection. Present work is suggested that intersection of bending rigidity of fabric and thread has strong linear relationship to magnitude of static needle thread tension at lock stitched sewing machine to predict the aesthetic seam appearance of stitched fabrics. The developed signal processing tools provide many features of the needle-bar force signals that are potential indicators of problems due to needle-fabric interaction. Nevertheless, no experimental work has yet been carried out to study the behavior of these features in situations of varying needle penetration efficiency. This chapter will present the work carried out to achieve this goal. To determine the most effective ways to monitor the needle penetration process, it is necessary to generate and compare situations of varying efficiency. The behavior of the computed features may then be studied and optimal values and/or trends defined.

The expectation is that the results obtained in the conditions of this experiment can be equally applied to other situations. Although numerically different, it may still be possible to find similar trends in the values when a normal sewing condition changes into a defect situation. This hypothesis can be endorsed if the behavior of the computed features can be adequately related to the underlying physical phenomena, which should be similar in most materials.

The initial experiment plan has been designed to address the factors involved in the study of needle penetration, so that the results provide a solid starting point for the definition of monitoring algorithms. In the experimental procedure, the variables were initially selected to create well-defined differences in results, so that the features that can be employed as best indicators for efficiency are easily identifiable. Then, the experimentation advances progressively to the comparison of cases expected to produce less significant differences.

Imbalanced / Variable Stitching

The study of the penetration process concerning needle size and fabric finishing state is expected to lead to some basic understanding of the potential indicators of sewing problems due to penetration [1]. In the third part of the experiment, defective needles are used. The aim is again to determine how this abnormal situation affects the computed features, confirm the effectiveness of the defect indicators found previously or search for alternative ones. This part will complement the studies carried out in the other two parts and will benefit from the previous experiences. The first piece of the planned experiment enables not only the analysis of needle penetration but also the study of the stitch formation and feeding systems [2]. On one hand, acquisitions performed at two different sewing speeds are expected to produce a different behavior of the feeding system. On the other hand, different needle size and thread linear mass chosen accordingly to the needle, will cause a natural progressive unbalance of the stitch possible of being studied with the respective indicators [3]. Materials with coarse inner architecture being easily made with modern additive or folding processes, the question of their overall behavior rises. Do they behave like classical elastic continua, or do they exhibit additional higher-order effects? Further, if present are those effects stable with respect to imperfections (geometry, constitutive material,) in this view, the current work is an experimental investigation for the need, in static, of a higher-order overall description [4]. It comes from noticing that such behaviors are up to now nearly exclusively studied from a theoretical and numerical point of view.

In the present study a noncentrosymmetric sample has been manufactured, based on an industrial honeycomb geometry used for aeronautic/aerospace composite materials. The geometrical anisotropy of the elementary cell and the scale separation ratio has been chosen in order to detect non-classical couplings. Samples are obtained by Fused Deposition Modeling (FDM), one of the most widespread 3D printing techniques. Simple experiments based on load controlled tests with full-field kinematic measurement have been performed [6]. A distributed load control reveals that the overall behavior of the architecture material cannot be described within the realm of Cauchy elasticity. As a consequence the overall physical properties of architectured materials are defined by the choice of constitutive materials, and of an inner structure. From a design point of view, it is often valuable to substitute the original architectured material by a homogeneous equivalent one. The interests are the emergence of relevant design parameters and gains in time computations, resulting in an easier exploration of their design space.

Needle Thread Breakage

String breakage and skipped lines are normal aggravations on any sewing floor since they hinder creation, influence quality, and diminishes the profit and proficiency of creation administrators As you can see then there are numerous factors that affect string breakage and skipped fastens. At first we will zero in on the attributes in string that effect string breakage, however later we will likewise examine an intelligent methodology utilized for investigating string breakage. Each sewing machine utilizes a needle to go string through the crease to frame a join [7]. Most sewing machines start their line shaping cycle when the needle begins to ascend from the lower part of its stroke. Ordinarily a skipped fastens or string break will happen while crossing another crease. This issue could happen because of the extra

thickness that the needle needs to enter. Assuming the needle size - string size relationship is inappropriate, the string won't be as expected cinched on the scarf side of the needle and unfortunate circle arrangement will happen.

In the event that the crease isn't stood firm on in a fixed foothold when the needle is rising, the crease will ascend with the needle and not structure an appropriate needle circle. This condition called hailing, is one of the most widely recognized reasons for skipped join and string breakage. This might make extra pressure the string or influence the needle to divert away from the join shaping gadget. Notwithstanding, commonly the skip or break happens just previously or after the thickness and typically the consequence of hailing [8]. This happens when a piece of the presser foot is as yet on the crease and the foot is done cinching the texture safely. In this manner, as the needle rises, the texture climbs with the needle and an unfortunate needle circle development happens. The intrinsic stretchiness or prolongation of the string is for the still up in the air by the fibre type and string development being utilized [9]. For instance, both nylon and polyester strings have a lot higher prolongation than 100 percent cotton strings. On the accompanying diagram you can see the connection among pressure and prolongation. The cotton string extends roughly 3 to 4% before it breaks. Polyester string, then again, extends roughly 17% to 20% before it breaks [10]. The polyester string has a higher lengthening at break that adds to more noteworthy crease versatility and crease strength. At the point when the string is extended as the needle arrives at the lower part of its movement in the join development cycle, the string will recuperate to its unique un-extended length as the needle rises.

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