

# APPLICATION OF THERMOPLASTIC STITCHED REINFORCED TAPE FOR SEAM QUALITY IMPROVING

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## INTRODUCTION

The seam performance has a significant impact on garment quality because joining garment pieces by seams is still the main technique for garment assembling. During the garment wearing and laundering, a lot of defects can arise, affecting seam quality, such as: seam slippage, seam tearing and seam deformation. Investigation of techniques to reduce seam slippage and increase seam strength and seam efficiency in the garment during production process is very important for the increasing seam performance and production of high quality garments.

There are various factors that can affect seam strength and seam efficiency. Many previous studies [1,2] showed that seam strength and seam efficiency depend on the interrelationship of fabrics, threads, stitch and seam selection, and sewing conditions, which include needle size, stitch density, appropriate operation, and maintenance of the sewing machines etc. Many researchers have investigated seam slippage in order to determine the causes of this phenomenon and to find techniques to reduce or eliminate it. The obtained results show that, higher weft density, cover factor, linear density of yarns and lower weave factor lead to seam slippage decreasing. [3,4,5]

## OBJECTIVITIES

The purpose of this paper is to investigate the possibilities of improving garment seam properties by reinforcing the seams by thermoplastic stitched reinforced tape. This kind of tape is trim material belonging to the group of thermoplastic interlining, which is used to increase the stability of textile materials and give support to garment form. The aim of the investigation is also to evaluate the effects of seam tape reinforcing on seam performance.

## MATERIALS AND METHODS

In this investigation, the seam quality was evaluated by seam slippage, seam strength and seam efficiency. Three lightweight woven fabrics for ladies blouses and thermoplastic lockstitches reinforced tape (Fig.1) were used. The characteristics of the thermoplastic stitched reinforced tape used are given in Table 1. The characteristics of fabrics used are given in Table 2.



Fig.1 Type of thermoplastic lockstitches reinforced tape

Table 1. Characteristics of thermoplastic lockstitches reinforced tape used in the tests

Composition	100% PES
Surface density of thermoplastic interlining	45 g/m <sup>2</sup>
Substrate	Non-woven fabric
Reinforcement	Stitches parallel to seam

Table 2. Characteristics of fabrics used in tests

Fabric	Composition	Weave	Linear density (tex)		Yarn density (dm <sup>-1</sup> )		Yarn thickness (mm)		Cover factor	Surface density (g/m <sup>2</sup> )
			T <sub>tw</sub>	T <sub>twf</sub>	n <sub>w</sub>	n <sub>wf</sub>	d <sub>w</sub>	d <sub>wf</sub>		
F1	SILK	plain	4	4	470	400	0.0075	0.0075	0.54	28
F2	PES	plain	4	4	350	290	0.0070	0.0070	0.40	47
F3	COTTON	plain	14	14	540	260	0.0135	0.0135	0.82	114

The fusing process was performed at the temperature of 135°C, 3 bar pressure for 13 seconds. Seam samples without reinforcement and reinforced with fused tape were sewn. A group of ISO standards (ISO 13934-2:2004 + ISO 13935-2:2004 + ISO 13936-1:2004) for determination of fabric strength, seam strength and seam slippage were used for seams testing. The samples were tested on ASDL Atlas tensile tester.

## RESULTS

The obtained results have shown that, insertion of thermoplastic stitched reinforced tape in the seam construction, resulted in improvement of seam slippage, seam strength (Fig. 2).

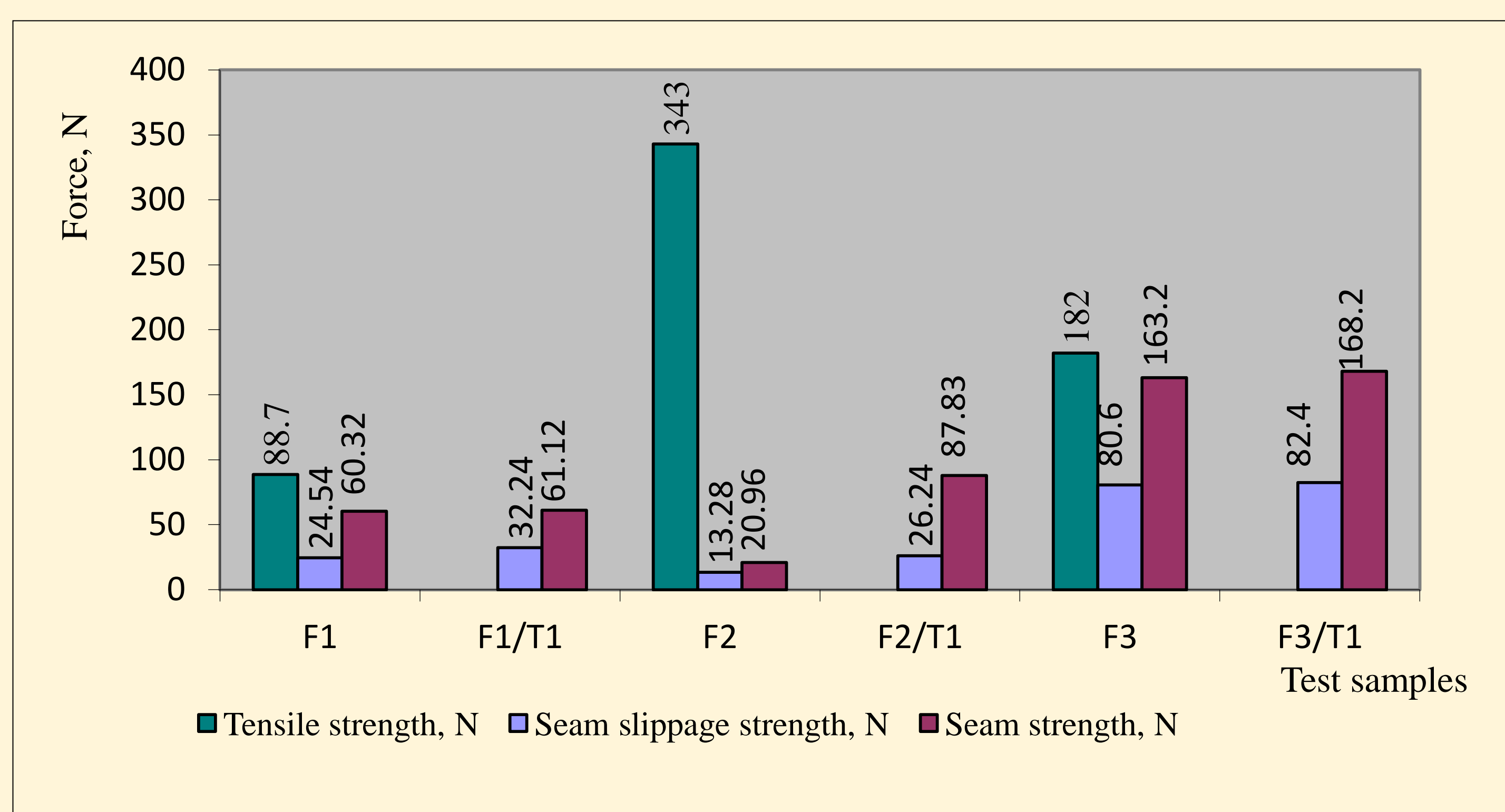


Fig.2 Tensile strength, seam slippage strength, seam strength of the fabrics with and without tape

## CONCLUSION

1. With the insertion of thermoplastic lockstitches reinforced tape in the seam construction seam slippage strength increases. The calculated percentage of seam slippage strength increasing is 31.38% for fabric F1, 97.59% for fabric F2 and 2.23% for fabric F3, Fig.3. Because the warp and weft fabric yarns in the fabric are fused together, the fabric structure becomes more consolidated and yarn slippage resistance increases.
2. With the insertion of thermoplastic tape in the seam structure, seam efficiency increases, too. The percentage of seam efficiency increasing is 1.32% for fabric F1, 319.14% for fabric F2, and 3.06% for fabric F3, Fig.5. Seam efficiency increasing for tape reinforced seams, due to the strengthening of the fabric structure in the seam area after the fusing process.
3. The improving of these garment seam properties is due to more complicated seam deformation of the seams with additional reinforcement. The seam under mechanical force requires extra energy which results in higher mechanical force for seam deformation.

## REFERENCE

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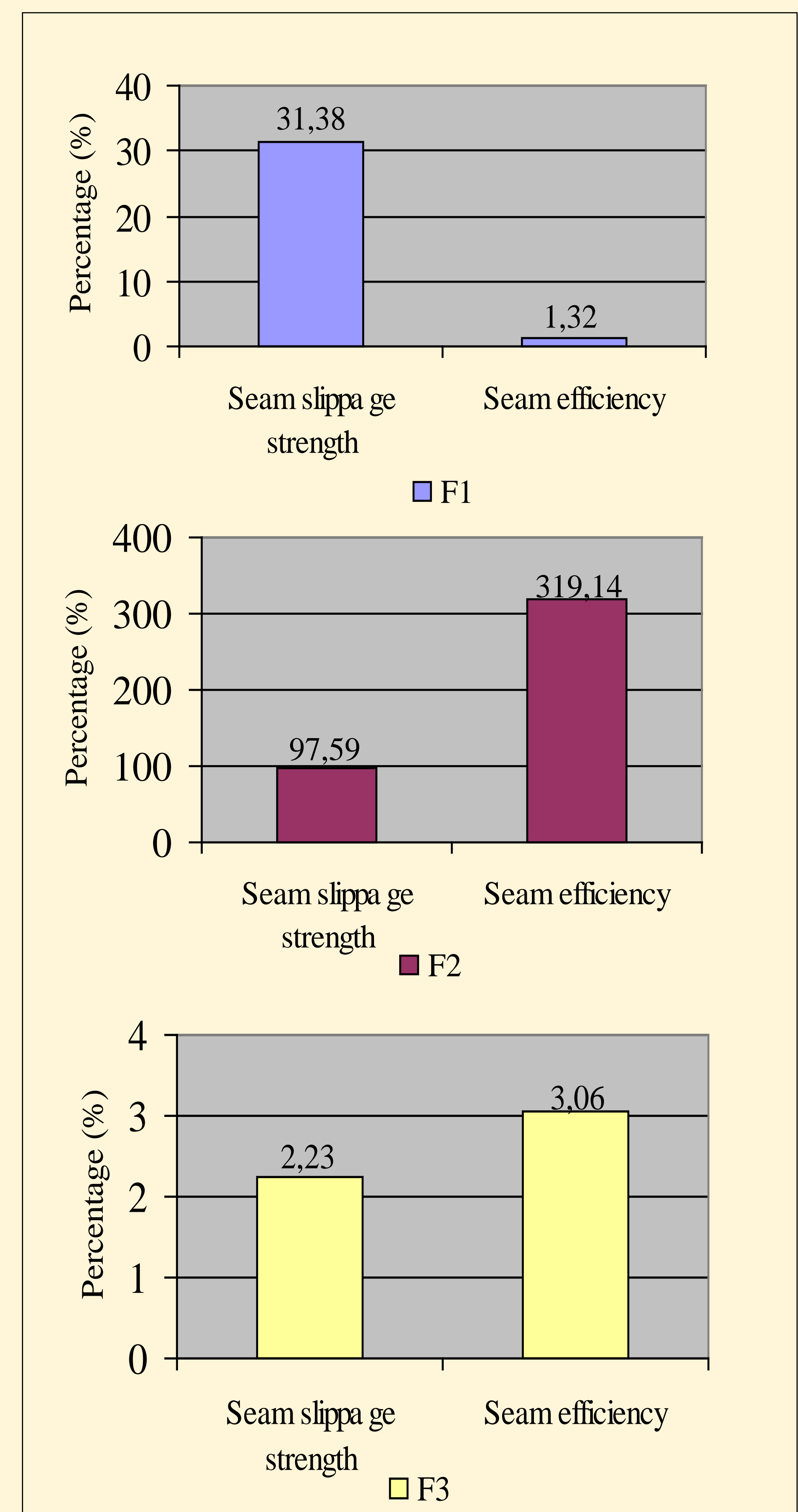


Fig.3 Percentage of seam slippage strength and seam efficiency increasing for seams with additional reinforcement