

Handheld Ultrasonic Ply Cutter

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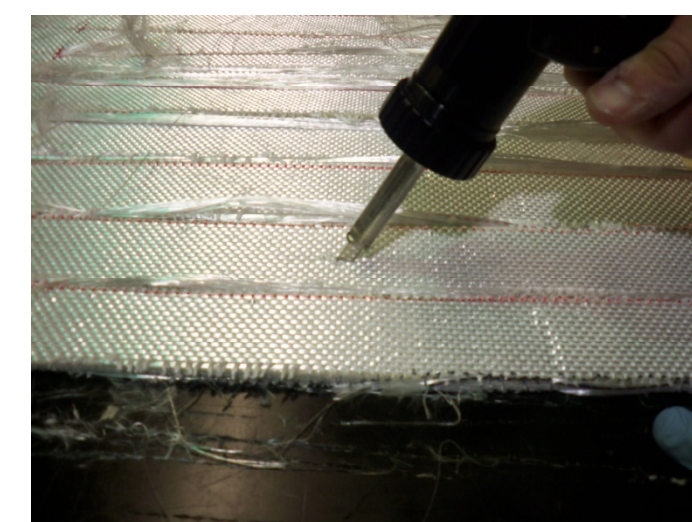
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Objective

- ◆ Evaluate Branson Ultrasonic Cutter to decide whether or not it is worth purchasing.

Method

- ◆ Compared ultrasonic cutter to foam/rubber cutter and scissors
- ◆ Cut each fabric in stock with both UC and foam/rubber cutter or scissors, and used a spreadsheet to rate ease of use, cutting rate, and edge finish



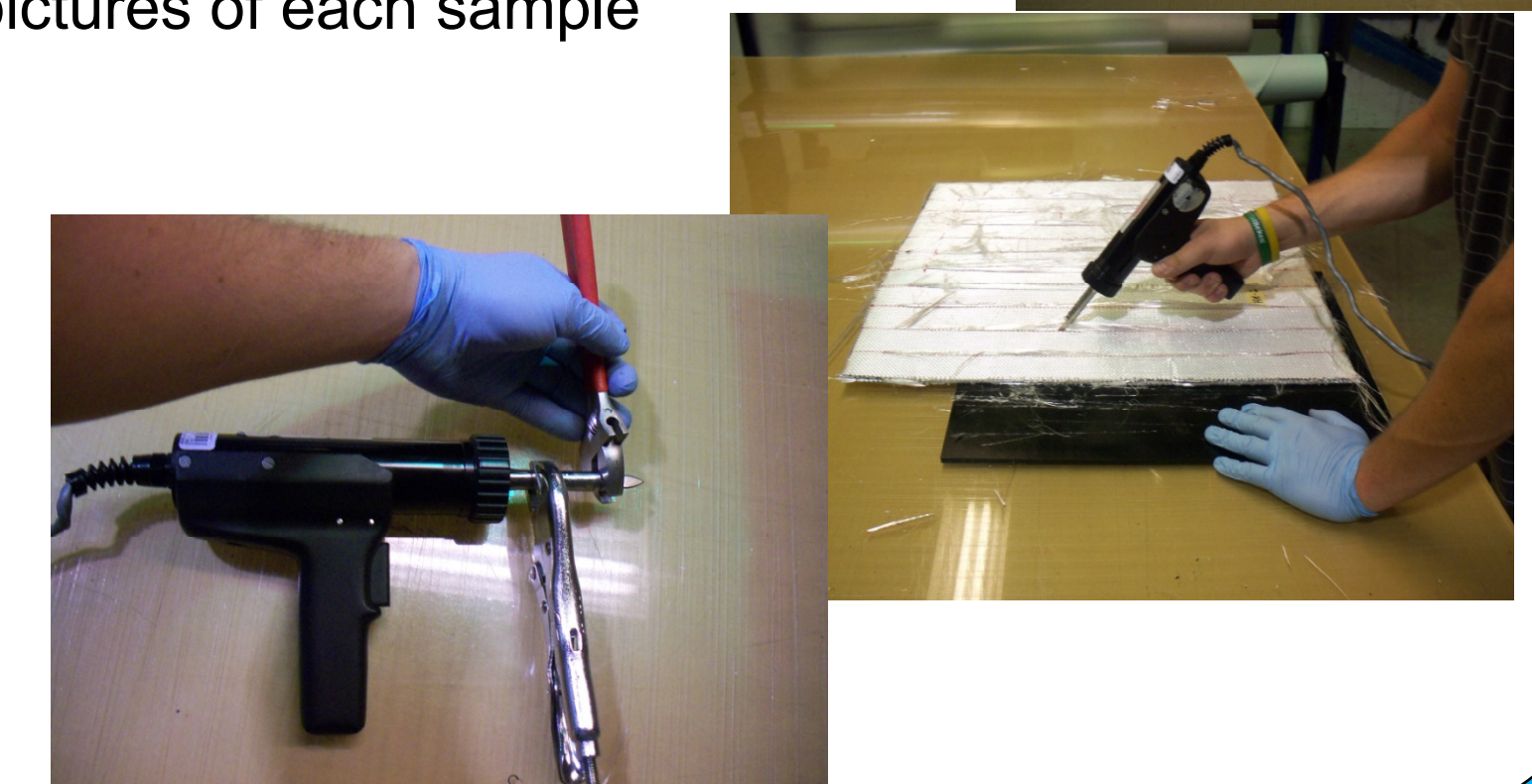
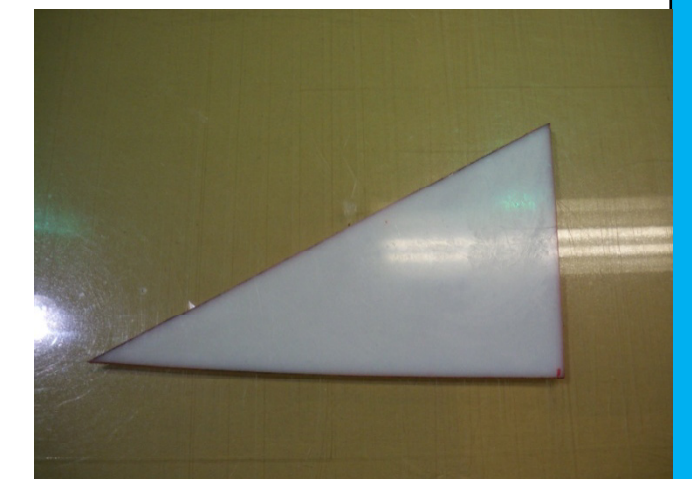
Introduction to Cutter

- ◆ Set up hardware
- ◆ Experimented with variables
 - ◆ Tuned amplitude
 - ◆ Varied cutting surface and fabric
 - ◆ Alternated cutting method
- ◆ Called contact at TMI
 - ◆ Correct amplitude, blade, method, surface?
 - ◆ Directed to sharpen blades with sand paper while cutter is engaged
 - ◆ Ordered additional blades



Cutting Trials

- ◆ Cut a triangle of polyethylene to establish standard cutting shape
- ◆ Traced shape onto each fabric and cut three different samples
 - ◆ Ultrasonic Sample
 - ◆ Scissors/Saw Sample
 - ◆ Steam a Seam Sample
- ◆ Used spreadsheet to record ratings
- ◆ Took pictures of each sample



Blade Life/ Cutting Rate Test

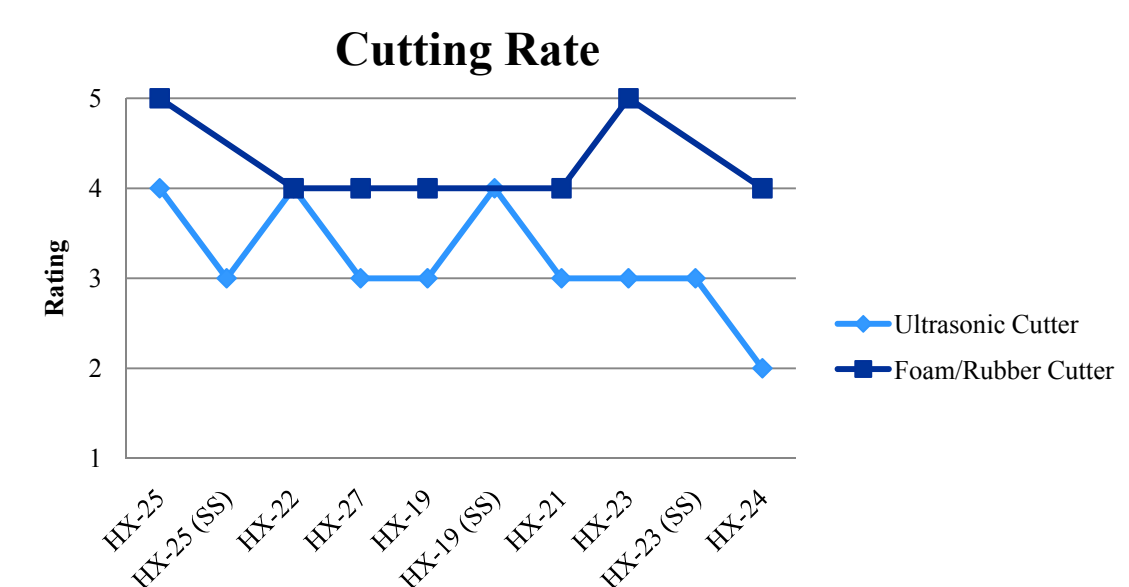
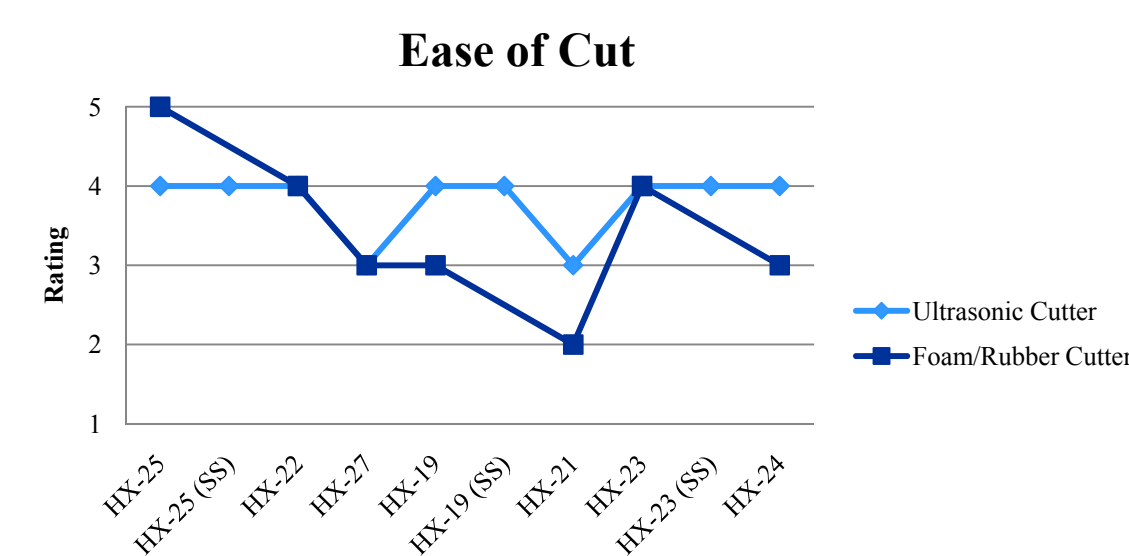
- ◆ Purpose:
 - ◆ Identify blade life with respect to distance cut
 - ◆ Quantify UC and foam/rubber cutting rate, and compare
- ◆ Procedure
 - ◆ Drew out ten 18" lines on a 2" by 2" piece of HX-23, performed 6 trials and recorded time with stopwatch
 - ◆ Measured distance cut after each trial and by 7th cut, blade was deemed past its lifetime
 - ◆ Repeated process with foam/rubber cutter



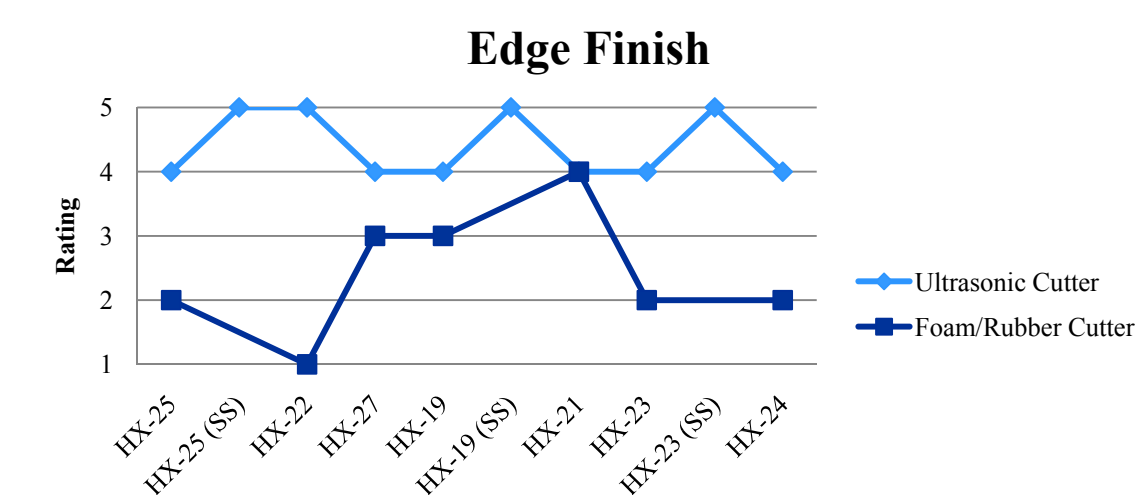
Foam/Rubber Cutter

Ultrasonic Cutter

Analysis



Analysis (Continued)



Blade Side	Trial	Distance (in.)	Cut Time (s)	Cutting Rate (in/s)
Side A	1	41	102	0.40
	2	39.5	108	0.37
	3	18	61	0.30
	4	22.5	110	0.20
Side B	5	35.75	94	0.38
	6	29	125	0.23
AVERAGE				0.31

Foam/Rubber Cutter	Trial	Distance (in.)	Cut Time (s)	Cutting Speed (in/s)
	1	36	35.75	1.01
	2	36	38.51	0.93
	3	36	37.85	0.95
	4	36	42.7	0.84
	5	36	39.47	0.91
AVERAGE				0.93

Conclusion

- ◆ Ultrasonic Cutter created a superior edge and was less physically demanding
- ◆ However, blade life was extremely low making the use of the cutter inefficient

ACKNOWLEDGEMENTS

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