Easy Opening Package Design

SCV (Song&Choi Vic Company

Mr. song
Mr. Choi

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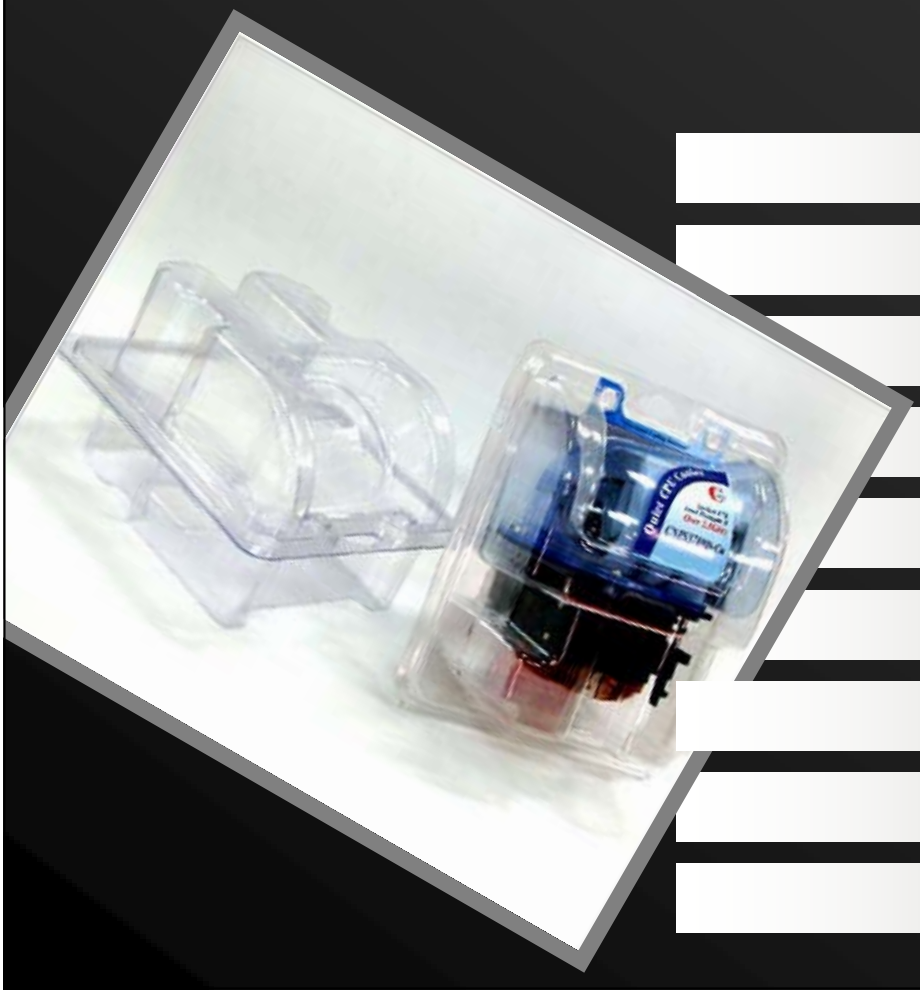

Goal of the Test

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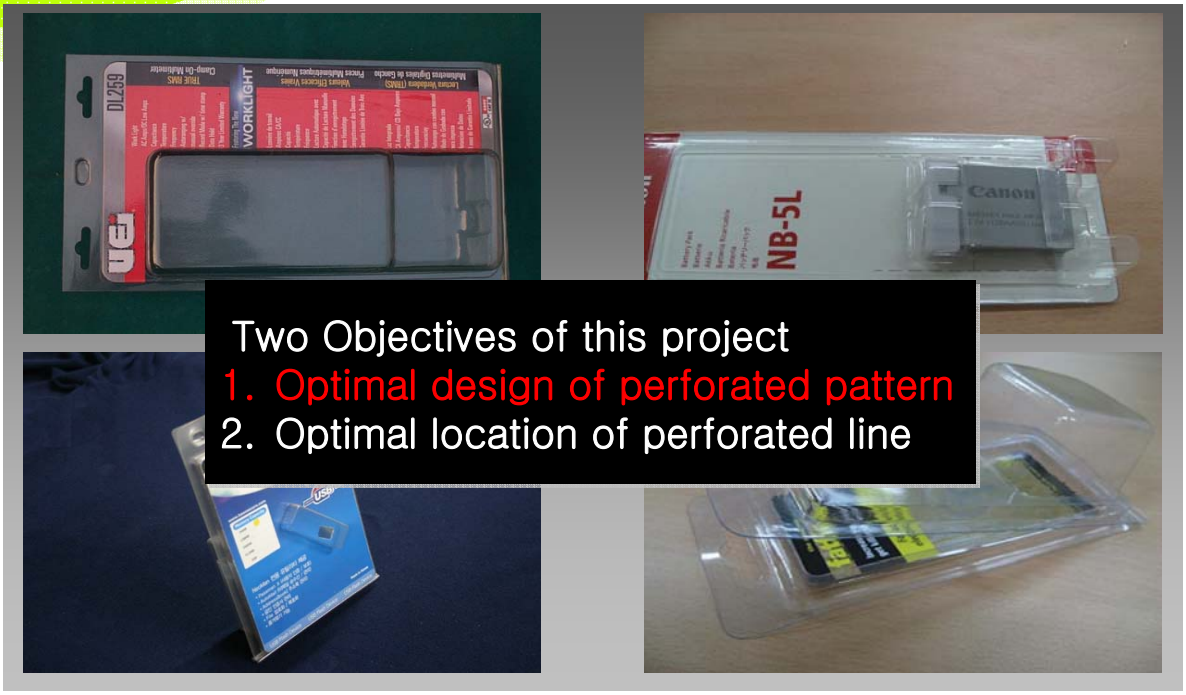

Two Objectives of this project
1. Optimal design of perforated pattern
2. Optimal location of perforated line

Test *Method*

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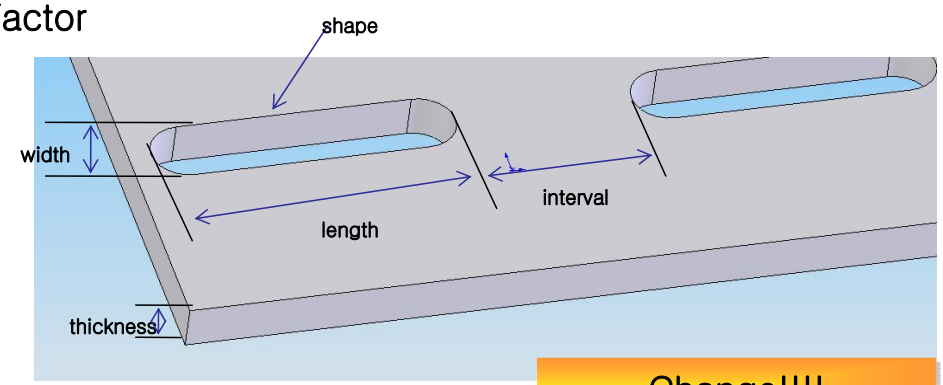
1. Method : Use Taguchi method

Change!!!!

2. Target : 1kg for opening package.
- According to our tensile test and tear test, sheet can resist about 5 times more force when tensile force applied than tear force applied.
- I want our package can handle 5kg product, so 5kg/5 = 1kg is our new target!

3. Factor



Change!!!!

4. Restricted Condition
- Material : PP and PVC (Area 150mm * 150mm)
- Patterns are started at its half shape.
- Pattern line is a unit with sheet's center line.

Test *Factor*

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Control factor of pattern line

Factor	Quantity		
	0	1	2
Shape	Triangle	Circle	Square
Length	1mm	3mm	5mm
Width	1mm	2mm	3mm
Interval	50%	150%	100%

Change!!!! Noise factor of pattern line

Factor	Quantity	
	1	2
Material	PP	PVC

We assume there is no interaction in control factor.

Sample *Making*

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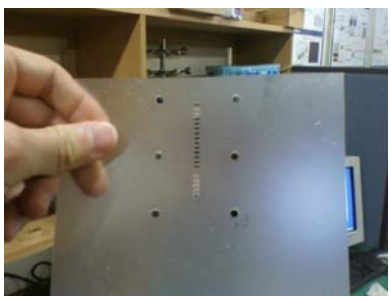
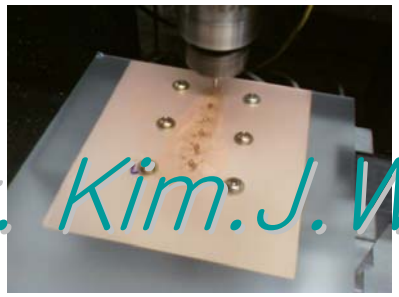
Programming

M/C Setting



Sample

Tool Dia : 0.3mm
Feed Speed : 1.5mm/s
RPM : 18000Rev/min
Lubricator : SP5000



Machining

Thanks, Mr. Kim.J.W!!

Testing

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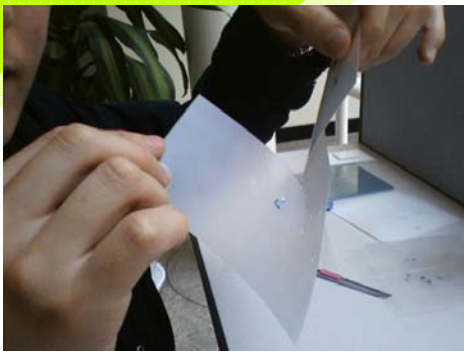

Sample Preparation

Testing

Tester Setting

Speed : 40mm/min

Max Force : 54kN

Test *Result*

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Orthogonal Array

Factor	A	B	C	D	Noise Factor		SN	AVERAGE
Name	Shape	Length	Width	Interval	Material			
Test No. \ Row No.	1	2	3	4	PP	PVC		
1	0	0	0	0	6.63	7.41	22.14	7.02
2	0	1	1	1	6.26	9.04	11.65	7.65
3	0	2	2	2	7.32	5.97	16.82	6.65
4	1	0	1	2	12.28	16.67	13.28	14.48
5	1	1	2	0	18.77	18.72	55.27	18.74
6	1	2	0	1	6.80	14.45	5.26	10.63
7	2	0	2	1	7.36	11.74	9.53	9.55
8	2	1	0	2	7.98	8.35	29.80	8.17
9	2	2	1	0	7.50	10.84	11.65	9.17

Test *Result*

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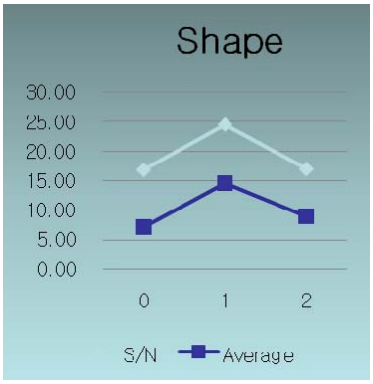
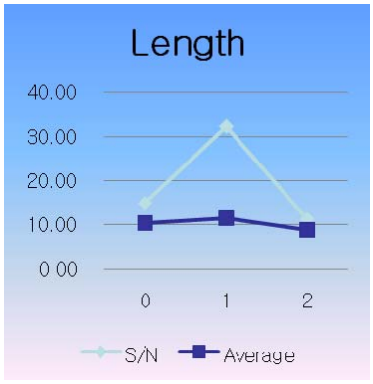
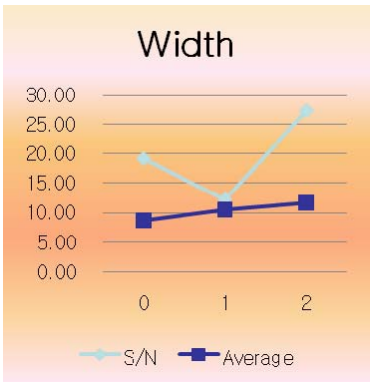
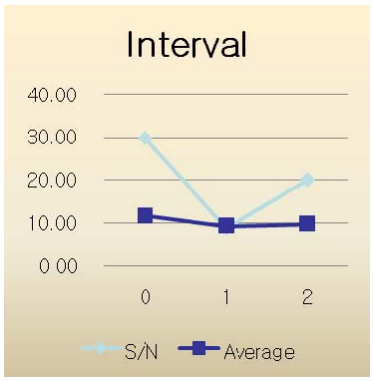
Factor	Level	S/N	Average
Shape	0	16.87	7.11
	1	24.60	14.62
	2	17.00	8.96
	Max-Min	7.74	7.51
Length	0	14.98	10.35
	1	32.24	11.52
	2	11.24	8.82
	Max-Min	21.00	2.70
Width	0	19.07	8.60
	1	12.19	10.43
	2	27.21	11.65
	Max-Min	15.02	3.04
Interval	0	29.69	11.64
	1	8.81	9.28
	2	19.97	9.76
	Max-Min	20.87	2.37









Summary

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1. Expected Optimal Pattern for the Package

Factor	Level	Expected S/N	Expected Force
Shape	Squre	47.66	11.21
Length	3mm		
Width	3mm		
Interval	1.5mm		

14% less than maximum S/N ratio & 14% over than target force

2. Thick about manufacturing method and productivity

To make the pattern cheaply, we must have to punch the sheet before vacuum forming, or install shape punch on the vacuum forming mold so it make pattern when vacuum forming occur.
To punch the sheet, the size of pattern can be big problem because of tolerance. I think our optimal pattern have enough tolerance because of its size and big S/N ratio. So it can be make by punch process.
And the time of punching is depend on the pattern position.

Next Schedule

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	May 5th Week	June 1st Week	June 2nd Week
Consider the thickness	→		
Reconfirm the Result		→	
Make Real Package Prototype			→
Anlaysis			→
Final Presentation			→