

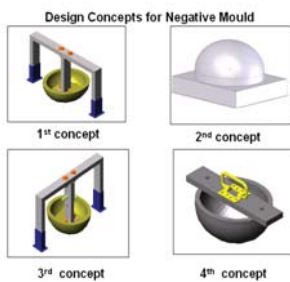
ABSTRACT

Shell helmet manufacturing industry using Acrylonitrile Butadiene Styrene (ABS) and Polycarbonate (PC) is so popular for basic usage by using injection molding method in its production. ABS and PC are a synthetic material produced through chemical reactions which are needed to go through heating and high pressurizing to use them. Material, design and development technique towards shell helmet manufacturing still hasn't changed along the century and it still depends on synthetic material to produce it. From these "research and development of motorcycle helmet shell using waste material such as coconut fibers. He used molding material from plaster of paris (POP) but many problems arise such as unsuitable molding design, too heavy, too sensitive, easily fractured, and unsuitable for the purpose of mass production (industrial purpose). The molding material used can have affect on the quality of the shell helmet produced. If the mould produced has a slight defect, it wills product defection towards the product when removed from the mold. The best mold must poises specialty such of the mold, high quality of mold and easy-handling for the purpose of mass production. The objective of this project is to make mould and to developed shell helmet by hand lay-up method. Besides, this project aims to do further research in order to develop mould from the material that has been discussed by considering major production aspect and developed mould prototype which has own specialization and commercial value. The material that has been used to make a mould is Aluminium 6061 and LM6.

OBJECTIVES

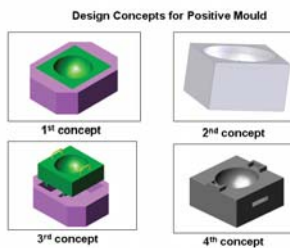
To make mould and to developed shell helmet by hand lay-up method. The aims to do further research in order to develop mould from the material that has been discussed by considering major production aspect and developed mould prototype which has own specialization and commercial value.

ANALYSIS



Criteria Evaluation	Concept reference	1 st concept	2 nd concept	3 rd concept	4 th concept
Heavy		S	+	S	S
Manufacturability	D	S	-	S	S
Aesthetics	A	S	+	+	-
Appropriate of usage	T	+	+	+	+
Safety	U	S	+	S	S
Fulfill the specification	M	S	S	S	S
Total +		0	1	4	2
Total -		0	0	1	0
Total 'S'		0	5	1	4

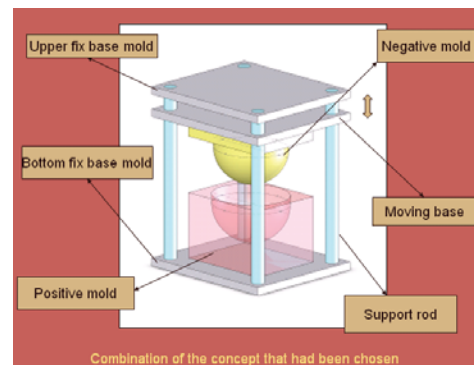
TABLE 1: ASSESSMENT FOR NEGATIVE MOLD



Criteria Evaluation	Concept reference	1 st concept	2 nd concept	3 rd concept	4 th concept
Heavy		-	+	-	-
Manufacturability	D	S	-	-	S
Aesthetics	A	S	+	S	S
Appropriate of usage	T	S	+	+	+
Safety	U	S	+	+	+
Fulfill the specification	M	S	S	+	+
Total +		0	0	4	3
Total -		0	1	1	2
Total 'S'		0	5	1	1

TABLE 2: ASSESSMENT FOR POSITIVE MOLD

FINAL DESIGN



Combination of the concept that had been chosen



THE PRODUCT



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NOVELTY & ADVANTAGES

- 1) New invention for helmet shell making process
- 2) High quality of product
- 3) Mould cost effectiveness
- 4) Perfect for commercial and production (SME)
- 5) Any thermoset materials
- 6) Convenient, easy & low cost of maintenance