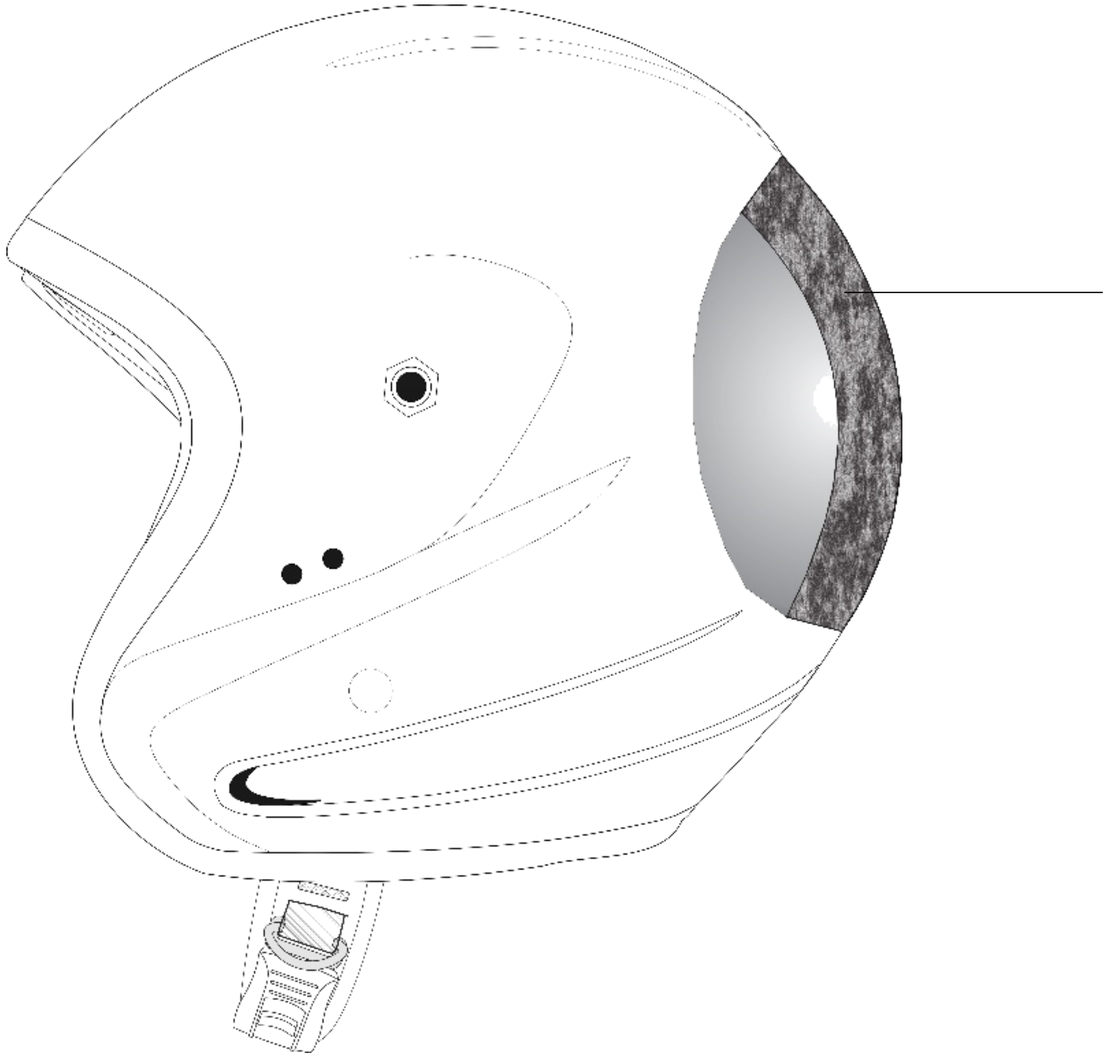
GREEN COMPOSITE

Protect Your Head, Protect The Earth





The shell made of Biocomposites filled by Palm Oil Empty Fruit Bunches fiber.
Absorbs the impact energy of collision and protect the head from injury

PT. INTERSTISI MATERIAL MAJU
Bogor – Indonesia

First Innovation

- Registered Patent No. P00201609159
- Registered Brand No. D002017041221
- Innovator : Dr Siti Nikmatin, M.Si (Lecturer & Researcher of Physics Department, Bogor Agricultural University)

ECO-friendly

- Made of Biocomposite (Filler: Palm Oil Empty Fruit Bunches Fiber; Matrix : ABS polymer)
- Reduce solid waste of palm oil production
- Reduce plastic usage

High Impact Strength

- Absorbs the impact energy of collision
- Frequency of dropped helmet (65.75 Hz) < Natural frequency of the skull (1410 Hz) and brain (72 Hz)
- Reduce the risk of head injury

Passed The SNI (Indonesian National Standard) 1811/2007/Amd1:2010 testing (Helmets for Road Vehicle Rides)

- Head Injury Criterion (HIC) scores about 750
- The Maximum HIC value permitted for :
  a. SNI : HIC ≤ 3000
  b. European Motorcycle Helmet Standard (ECE) : HIC ≤ 2400
  c. US department of transportation (DOT) : HIC ≤ 2400
  d. American Society for Testing materials (ASTM) F1292-04 : HIC ≤ 1000

Light Helmet

Helmet weight about 1.12 kg

Awards

- West Java Innovation Award 2016, Environmental Category
- 108 Indonesian Innovation 2016 from Business Innovation Centre (BIC), Advanced material Category
- The Best Innovation in Bogor Innovations Award 2017
- Top 10 Start up, Breakthrough innovations Indonesia 2017 from Ministry of Research, Technology and Higher Education of the Republic of Indonesia

Head Injury Criterion (HIC)

measure of the likelihood of head injury arising from an impact

No	Helmet Sample	Head Injury Criterion (HIC) [Temperature Variations]			Maximum HIC Value Permitted		
		15°C Ambiant	50°C Hot	-20°C Cold	SNI	DOT	ASTM
1	GC Helmet	753	562	498	3000	2400	1000
2	Common Helmet 1	623	863	856			
3	Common Helmet 2	3632	3391	4174			

SNI : Standar Nasional Indonesia (Indonesian National Standard)
DOT : US department of transportation
ASTM : American Society for Testing materials

Head Injury Probabilities of GC Helmet:

0% **Fatal Injury**
4% Critical Injury
70% Moderate Injury
95% Minor Injury

Table 2 ASTM-F1292-04 Standard Probabilities of head injury relative to HIC

HIC Score	Minor Injury (%)	Moderate Injury (%)	Critical Injury (%)	Fatal (%)
0	0	0	0	0
250	40	20	0	0
500	80	40	2	0
750	95	70	4	0
1000	98	90	8	2
1250	100	95	10	2
1500	100	98	20	4
1750	100	100	45	10
2000	100	100	70	30
2250	100	100	90	70
2500	100	100	95	90
2750	100	100	98	95
3000	100	100	100	100

GC Helmet

Maximum HIC value permitted for ASTM

Maximum HIC value permitted for ECE & DOT

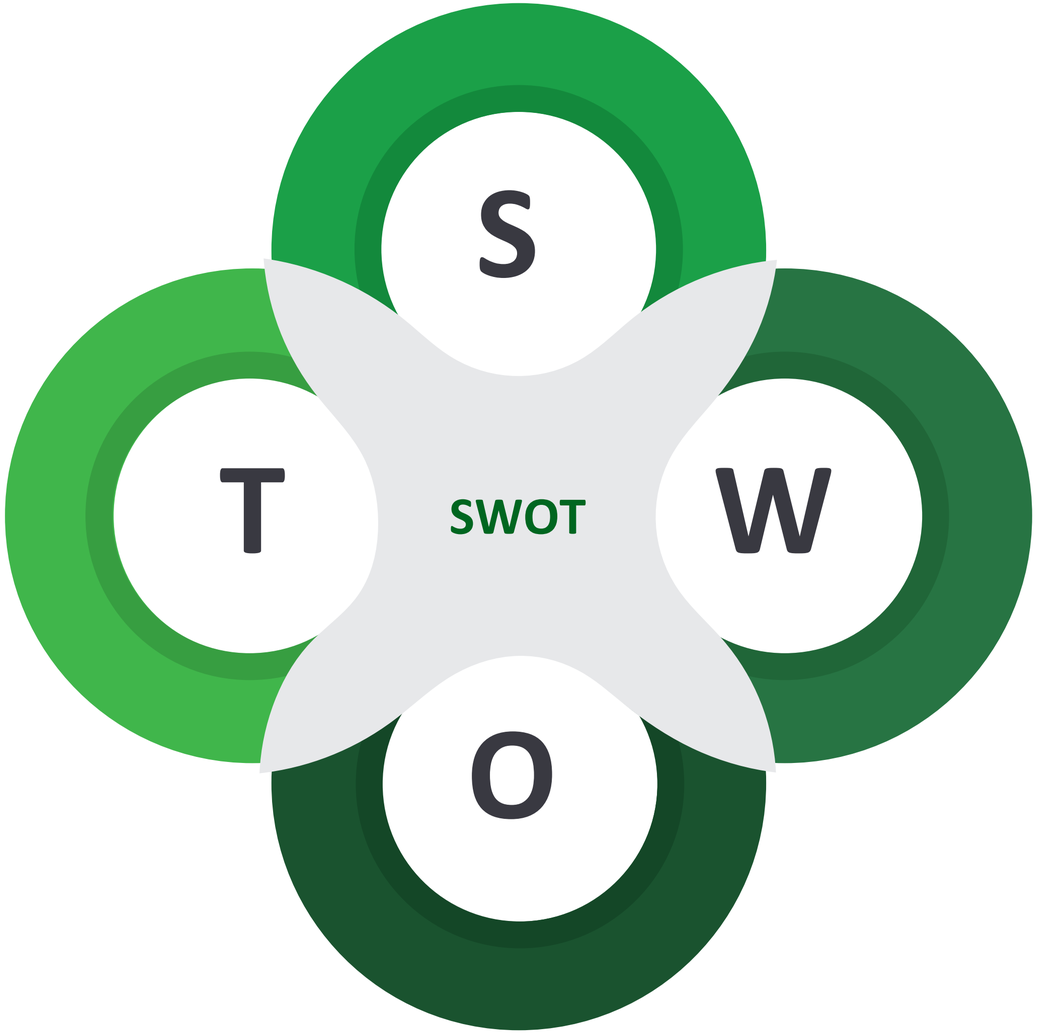
Maximum HIC value permitted for SNI

Strength

- First Innovation Product
- Eco-friendly
- High Impact Strength
- Passed the SNI testing for Helmets for Road Vehicle Rides
- Light Helmet

Weakness

- The product has not been widely known by consumers
- Limited Production Capacity (Limitation of Production machinery)
- Limited Design and Model of the helmet



Opportunity

- Abundant fiber raw materials
- Many Motorcycle Users
- Consumer Interest in Green Product
- Helmet innovation can be developed continuously

Threat

Competitor :

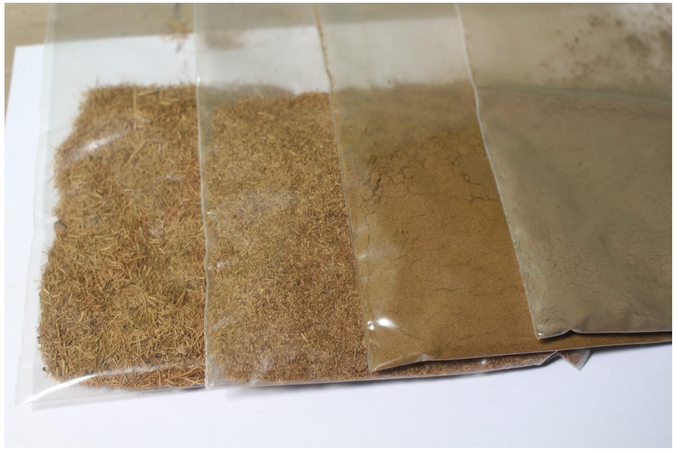
- Cheaper helmet
- Famous helmet brand
- Companies with extensive distribution channels

Palm Oil Empty Fruit Bunches Fiber Production









Extrusion Process of Granular Biocomposites

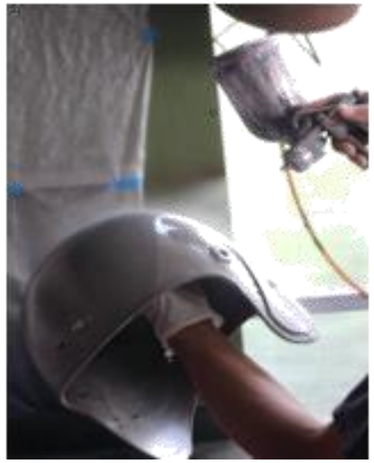







Injection Molding of Helmet Shell

Helmet Painting






GC Helmet - Retro

GC Helmet - Google



GC Helmet - Rookie



GC Helmet - Sport

GC Helmet - Kids

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GREEN COMPOSITE

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GC Helmet

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