

## Asia 2015 6<sup>th</sup> - 8<sup>th</sup> of Jul

### AUTOMOTIVE LIGHTWEIGHT

# PROCUREMENT SYMPOSIUM

Jumeirah Himalayas Hotel in Shanghai, China



#### SYMPOSIUM FOCUS

- Aluminium
- Carbon Fibre
- Composites
- High Strength Steel
- Magnesium

## HIGHLIGHTS

### • INTERNATIONAL SPEAKERS

AUDI - MAGNA - DGS - GEELY - NOVELIS - JSC - VOESTALPINE, ...

### • LIGHTWEIGHT TECHNOLOGY EXHIBITION

DGS - StrikoWestofen - Kurtz - Novelis – Idra

### • SIMULTANEOUS INTERPRETING

Chinese - English / English - Chinese

#### ATTENDING COMPANIES



#### MEDIA & ORGANIZATION PARTNERS



Brings together the procurement and supply side of lightweight materials and their advanced processes in accompany with cost balance or reduction....

## AluMag® offers the four following services - worldwide:



Market Research

- Aluminium Extrusion Customer Database
- Foundry & Tool Maker Database
- Automotive Application, Material & Process Analyses
- Various Industrial Application Research & Analyses

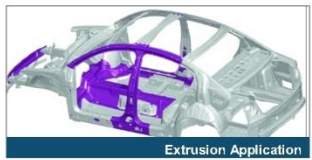
AluMag as your provider of automotive research and forecasting studies, offers you and your business, the market intelligence you need to realize the best strategic decisions



Material - Process - Application Trend Analysis

### Large variety of market access, local & global:

- business database with 6,970+ companies and 18.700+ contacts
- 150+ satisfied customers worldwide
- Arranged 20+ roadshows/events since 2008



Extrusion Application

### Your Benefits:

- Learn about your [potential] clients and competitors
- Obtain an inside view of the market
- Identify opportunities and threats
- Minimize risk and optimize profits
- Position your company successfully
- Based on data off the shelf, secondary re-search and interviews, AluMag generates validated researches



Market Development

- Analysis & Development of Market Opportunities
- Accelerate Market Penetration
- Manage New Product Launches
- Establish a Sales Force Sales on Demand

AluMag guides and supports your organization globally through the different market development phases until we have successfully launched, implemented or executed your project.



Map of activity - SAMPLES

Manage and integrate each aspect of your organization by initiating, planning, controlling, executing and closing out a new project. AluMag offers liaison management services as an addition to our customer's staff by bringing in the resources that define us.



JATCO Head Quarters Meeting in Japan

### Your Benefits

- Analysis and development of Markets
- Realize opportunities
- Accelerate market penetration
- Establish a sales force
- Provide warehousing and distribution services
- Manage new product launches
- Sales on demand



Roadshows / Events

- Organization of Technical & Commercial Roadshows
- Oversea Commercial & Technical Events
- Host In-House Events & Presentation
- Common Technology Booth at Leading Exhibitions

AluMag roadshows, tech-meetings and symposia are the first class events used by exhibitors and guest as a unique benchmark platform.



Daimler Sindelfingen as Roadshow Location

The AluMag think tank events are bringing in decision makers and executives in EUROPE, ASIA and NAFTA.



G M VIP at AluMag Booth SAE in Detroit

### Upcoming Events:

- 2015 Jul: Automotive Light-weight Procurement Symposium in Shanghai, China
- 2015 Nov: Automotive Light-weight Procurement Symposium in Detroit, USA
- 2016 April Common tech- booth at the SAE World Congress in Detroit, USA
- 2016 Jul: Automotive Light-weight Procurement Symposium in Shanghai, China



Strategic Localization

- Warehousing & Distribution Service
- Supplier & Tie-up Localization
- Identification & Trade-off of new Technology
- Foreign Market Business Cases and whose Realization

AluMag has the global expertise to search, identify, evaluate and validate potential strategic business opportunities for expansions and partnerships that will assist your business growth plans regionally and globally



On-Site Greenfield Planning Meeting

### Services for:

- Search, develop and present potential acquisition candidates for regional and global business expansions
- Localization of new manufacturing / service sites for business expansions
- Identification of new technology supplier development related to products, processes and materials
- Search, develop and present potential business partners / suppliers to support regional and/or global supply programs
- Evaluate potential competitor profiles for new or existing business in non-presence geographies
- Evaluate new emerging technologies and processes for business expansions

### Are you:

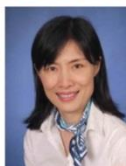
- looking for specific data, information and outlook about product, material, customer, supplier, technologies, ...
- want to discuss your project, increase sales, access new markets, ...
- interested to participate in one of our roadshows / events or organize your customized showcase ...
- looking to localize, expand into new markets, countries, tie-up targets, ...

please contact your AluMag Team to receive a quote or proposal

## CONTACTS & PROJECT TEAM



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**Asia Automotive Lightweight Procurement Symposium**  
**6th – 8th of July 2015**  
Jumeirah Himalayas Hotel in Shanghai, China.



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**AluMag®**  
Europe ■ India ■ Americas ■ Asia  
**THE MARKET DEVELOPER**

## Company Speechs by:

<u>Audi AG</u>	<u>10</u>
<u>Magna Steyr Engineering AG &amp; Co KG</u>	<u>16</u>
<u>DGS Druckguss Systeme AG</u>	<u>42</u>
<u>Guangdong Hongtu Technology Co.,Ltd</u>	<u>58</u>
<u>Kurtz GmbH</u>	<u>68</u>
<u>Voestalpine AG</u>	<u>90</u>
<u>JSC Automotive Consulting Co. Ltd.</u>	<u>108</u>
<u>StrikoWestofen GmbH</u>	<u>124</u>
<u>Geely Automobile Research Institute</u>	<u>140</u>
<u>Novelis China</u>	<u>156</u>
<u>Sapa Technology Asia</u>	<u>174</u>
<u>Kobelco (China) Holding Co Ltd.</u>	<u>202</u>
<u>GASGOO Research Institute</u>	<u>224</u>
<u>AluMag Automotive GmbH</u>	<u>225</u>

# Agenda

## Agenda: (Is Continuously Being Updated)

### Monday The 6th Of July – Jumeirah Himalayas Hotel, Shanghai – 6th Floor

06:00pm - 10:00pm

Pre-registration and Welcome Reception

### Tuesday The 7th Of July – Jumeirah Himalayas Hotel, Shanghai – 6th Floor

08:30am – 09:15am

Registration & Morning Coffee / Tea

09:15am – 09:30am

Welcome:

Mr. Jost GAERTNER, Managing Partner at ALUMAG Automotive GmbH

09:30am – 10:25am

Opening Keynote:

Mr. Frank VENIER, Strategy and Innovation; Lightweight Design Centre at AUDI AG

**Lightweighting SUV - The New Audi Q7 In Multimaterial Car Body Design**

10:25am – 11:00am

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

11:00am – 12:00am

Paper 1 – Part 1:

Mr. Gerhard KRACHLER, Director Advanced Development & Product Strategy at MAGNA STEYR Engineering AG & Co.KG

Paper 1 – Part 2:

Mr. Christian JURICEK, Manager R&D Europe at COSMA MAGNA International

**Magna's Global Advanced Lightweight Competences**

12:00pm – 01:45pm

Break for Refreshments/Coffee/Tea, Lunch, Networking, Tech Exhibition

01:45pm – 02:25pm

Paper 2:

Mr. Andreas MUELLER, CEO at DGS Druckguss Systeme AG

**Localization And Industrialization Of Cast Aluminium Structural Applications**

02:30pm – 03:10pm

Paper 3:

Mr. Li WAN, Vice President at Guangdong Hongtu Technology (Holdings) Co Ltd

**Aluminum Alloy High Vacuum Die Casting Technology And It's Application On Automotive Structural Parts**

03:15pm – 03:45pm

Paper 4:

Mr. Lothar HARTMANN – Managing Director Foundry Machines & Trimming Presses at Kurtz GmbH

Mr. Michael BARTEL – Asia Sales Manager Foundry Machines & Trimming Presses – Kurtz GmbH

Low Pressure Casting

A traditional casting technology helping to step ahead for light weight solutions in engine block manufacturing

03:45pm – 04:15pm

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

04:15pm – 04:55pm

Paper 5:

Mr. Peter BERNSCHER, Member Of The Board & Director Automotive Body Parts at Voestalpine Metal Forming GmbH

**Lightweight Solutions In The Automotive Industry By Voestalpine**

05:00pm – 05:55pm

Closing Keynote:

Mr. Jochen SIEBERT, Managing Partner at JSC Automotive Consulting Co. Ltd.

**Outlook And Hurdles Of The Chinese Economy And Automotive Industry**

05:55pm – 06:00pm

Summary:

Ms. Ying ZHOU, Project Coordinator China – Japan at ALUMAG Automotive GmbH

06:00pm - 10:00pm

Reception Sponsored By StrikoWestofen

Dinner Speech – Part 1:

Mr. Rudolf RIEDEL – Group Managing Director at StrikoWestofen GmbH

Dinner Speech – Part 2:

Mr. Rainer ERDMANN – Managing Director Asia Operations at StrikoWestofen Thermal Equipment Co.Ltd

**Profits With Light Metal Castings Start In The Melt Shop**

# Agenda

## Agenda: (Is Continuously Being Updated)

### Wednesday The 8th Of July

08:15am – 08:55am

Opening Keynote:

Prof. Fei XIONG Chief Engineer & Director of Auto Lightweight Department at GEELY

#### **Automotive Lightweight Promoting The Application Of Aluminium**

09:00am – 09:40am

Paper 1:

Mr. James LIU, Managing Director and Vice President of Asia Auto at NOVELIS China

#### **High Volume Aluminum Solutions For Lightweighting**

09:45am – 10:25am

Paper 2:

Dr. Jin HOU – General Manager – Sapa Technology Asia

#### **High Performance Aluminium Alloys For Automotive Light-Weighting**

10:25am – 11:00am

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

11:00am – 11:40am

Paper 3:

Mr. Yoshikazu MUKAI, Executive Vice President & Technical Specialist at Kobelco Automotive Aluminium Rolled Products (China) Co.,Ltd – Shanghai Branch

#### **Kobe's R&D Activities For Automobile Lightweighting**

11:45am – 12:25pm

Closing Keynote:

Mr. Martin SHI, Chief Editor at GASGOO International And Senior Analyst at GASGOO Research Institute

#### **The Status And Development Trends Of China Automobile Lightweight**

12:30pm – 12:35pm

Summary:

Mr. Jost GAERTNER, Managing Partner at ALUMAG Automotive GmbH

12:45pm – 01:00pm

Walk To The SNIEC  
Shanghai New International Expo Centre

01:00pm – 01:40pm

Reception With  
Snacks & Finger Food at the SNIEC

01:40pm – 05:30pm

Individual Or Guided Visit At The 2015 "Aluminium China " And "China Diecasting" Exhibitions

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Backup Speech

Mr. Jost GAERTNER, Managing Partner at AluMag Automotive GmbH

#### **Top 16 Global Ranking Of Aluminium And Magnesium Foundries By Revenue**

# EXHIBITOR

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# GEELY



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**[www.geely.com](http://www.geely.com)**

## **TITLE**

**Automotive Lightweight Promoting The Application Of Aluminium**

## **ABSTRACT**

With the environmental and government requirement, reducing weights for auto vehicle are becoming one of the hottest topics globally. Automotive lightweight technology is pushing the fast development of new material, new manufacturing process and the structure optimization. High strength material, light materials such as Al, Mg etc. are used widely in auto body to skin off some of the weight added on due to the factors of the safety, comfort and others. This presentation will be focusing on the following topic: (1) Full Aluminium Body in Geely's New energy sources vehicle (PEV); (2) Setting up the PEV lightweight target and lightweight technology to be used; (3) Typical Al application in details; (4) Aluminium body structure application's feasibility analysis including manufacturing cost evaluation; and (5) challenges facing the application of aluminium body. A couple of examples of Al alloy components' development are to be presented.



## Full Aluminium Body for PEV

Fei Xiong (Ph.D)

GEELY Auto



Produce\_0.avi

**Why aluminum – Lightweight Technology**

**Geely PEV Project**

**PEV Lightweight Target**

**PEV Lightweight Technology Analysis**

**Challenges**

**Why aluminum – Lightweight Technology**

**Geely PEV Project**

**PEV Lightweight Target**

**PEV Lightweight Technology Analysis**

**Challenges**

## GEELY Why Aluminium - Lightweight?

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## GEELY Why Aluminium - Lightweight?

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**GEELY**

## Why Aluminium - Lightweight?



~35 kg



~ 13 kg

**GEELY**

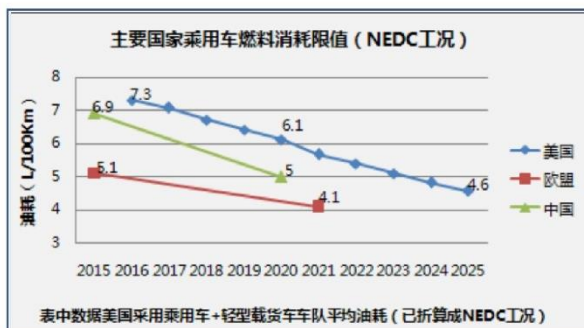
## Why Aluminium - Lightweight?

--- Automotive Lightweight Technology Background

### Policies

#### Fuel

GB19578、CAFE、ACEA



#### Emission

July 1, 2014 – National IV emission standard

### Customers

**Fuel Economy**

**Vehicle Dynamics**

### OEM Competitiveness

#### Cost

1kg reduction in weight results in \$10 saving.

#### Competitiveness

Lightweight technology – company core competitiveness

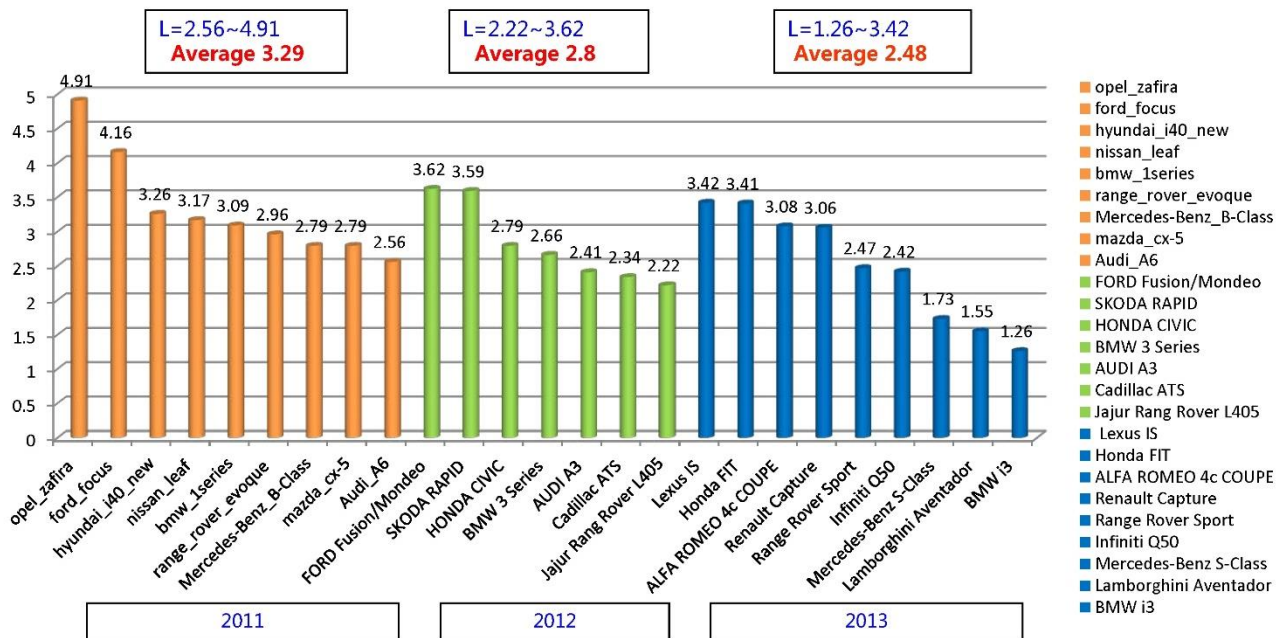
Toyota: Target – weight reduction of 10~30% by 2016 in its all small to medium vehicles

.. Almost every OEM has its own lightweight target . . .

## GEELY Why Aluminium - Lightweight?

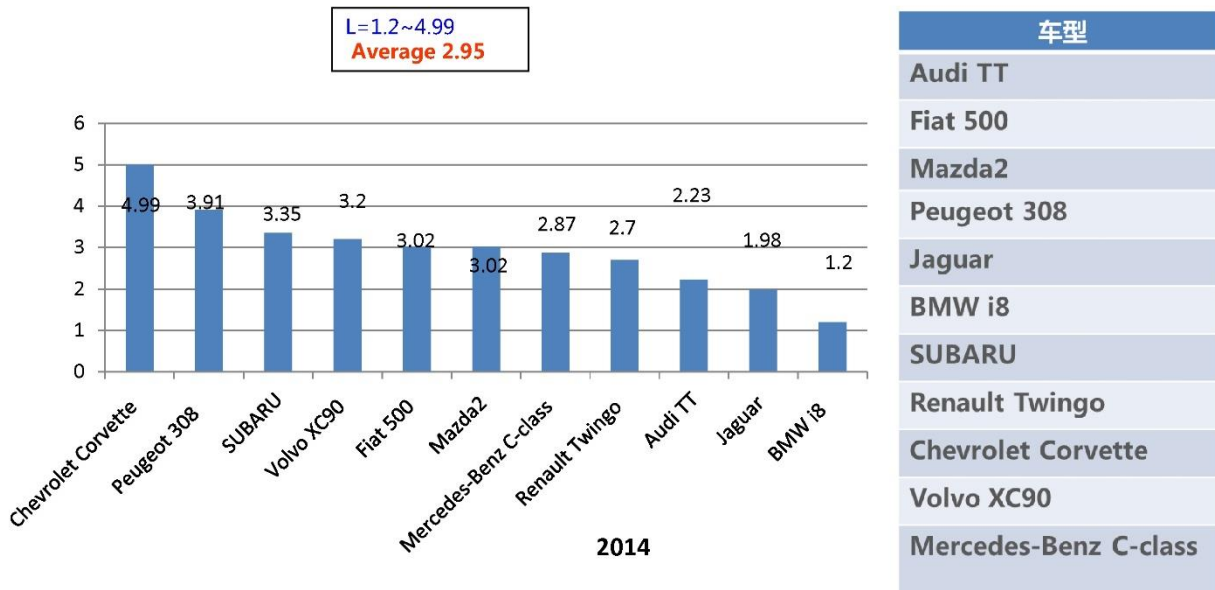
### --- Automotive Lightweight Technology Background

Lightweight Index Trend



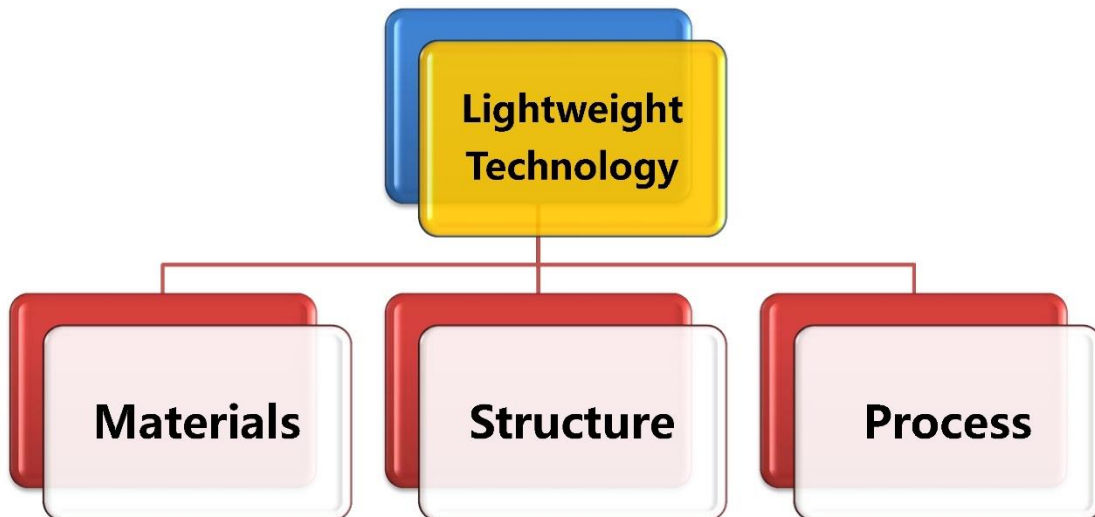
## GEELY Why Aluminium - Lightweight?

### --- Automotive Lightweight Technology Background



## GEELY Why Aluminium - Lightweight?

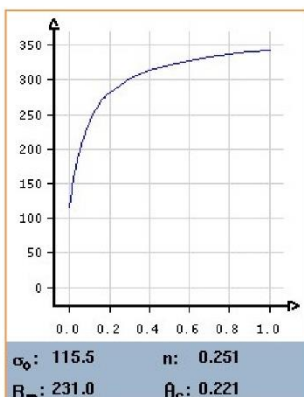
--- Automotive Lightweight Technology Background



## GEELY Why Aluminium - Lightweight?

--- Automotive Lightweight Technology Background

➤ One of the best candidate materials for lightweight



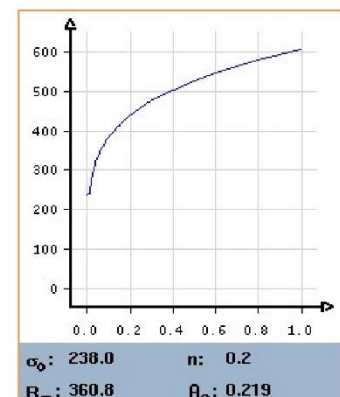
6016T6, 1.0mm

材料轻量化指数计算  
以弯曲情形为例  
( $L^2/h = 1000$ )

6016T6	B180H1
1510	768

$$LBK = \frac{R_{\sigma 0.2}}{(\rho \cdot g) \cdot L^2/h}$$

LBK越大, 所选择的材料就越适合轻量化设计针对的载荷情况



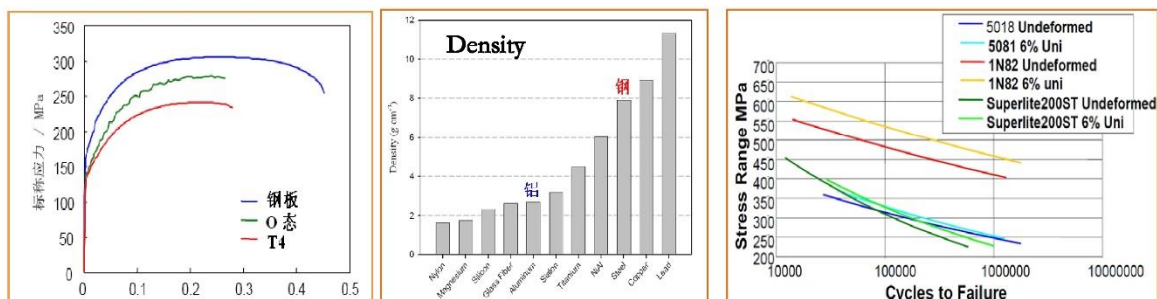
B180, 0.7mm

**LBK - Material Lightweight Index**

Al - better lightweight material in comparison with steel.  
(Higher load capacity per unit weight)

## GEELY Why Aluminium - Lightweight?

### --- Automotive Lightweight Technology Background



板厚 (mm)	抗拉强度 (MPa)	屈服强度 (MPa)	延伸率 (%)	拉伸应变硬化指数 n 值 (10-15%)	塑性应变比 r 值 (15%)
0.9	241	133	28	0.26	0.84
1.0	280	142	28	0.30	0.78
0.7	309	170	44	0.23	1.59

←钢板

Automotive Lightweight demand is pushing wider application of Al alloys.

$$S\sigma_n \geq S_o\sigma_o \quad \Rightarrow \quad \sigma_n \geq T_o\sigma_o / T_n$$

## GEELY Contents

Why aluminum – Lightweight Technology

Geely PEV Project

PEV Lightweight Target

PEV Lightweight Technology Analysis

Challenges

## GEELY Full Aluminium in Geely PEV

AMA platform

XXX model – 5 yrs 200K



Model*	Length mm	Width mm	Height mm	W/Base mm	Distance km	Max Speed km/h
A	2742	1566	1566	1868	250	120

## GEELY Contents

Why aluminum – Lightweight Technology

Geely PEV Project

**PEV Lightweight Target**

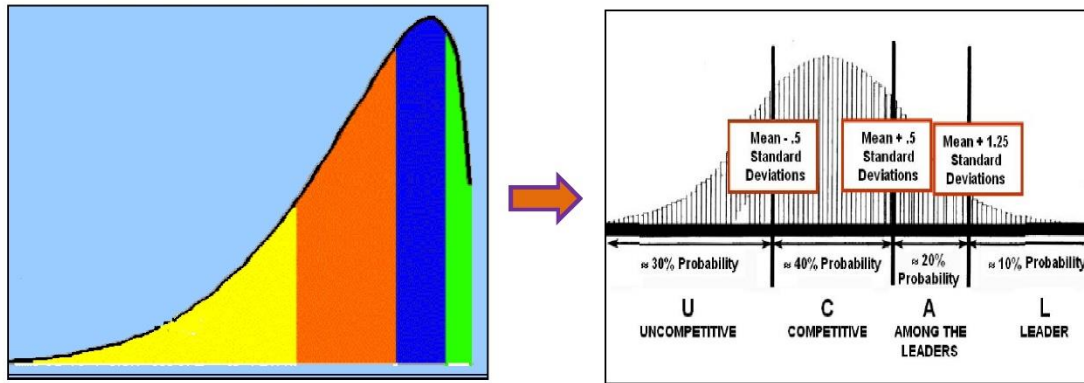
PEV Lightweight Technology Analysis

Challenges



## GEELY PEV Lightweight Target (PALS Model)

### - Products Attribute Leadership Strategy



Based on the benchmark and competitors' data (no less than 5 data), calculating the average to define C' s average.

L - ~10% ; A - ~20% ; C - ~40% ; U - ~30% ;

每个子组的标准差:

$$S = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n - 1}}$$

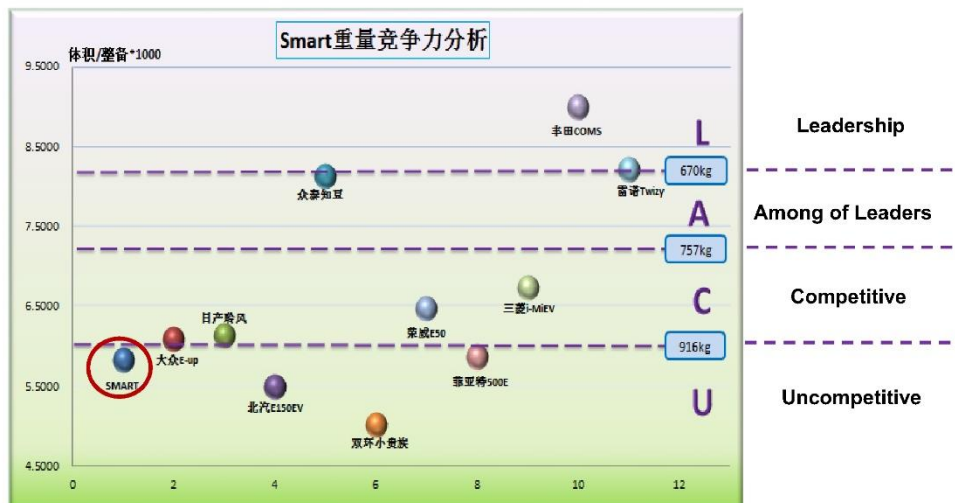
第 17 页

## GEELY PEV Lightweight Target (PALS Model)

### - Products Attribute Leadership Strategy

#### Benchmark - Smart

Smart curb mass: 943kg , PALS model shows it's in the uncompetitive range.



A lightweight target of 750kg is set with 5 different body structure designs

## GEELY PEV Lightweight Target (PALS Model)

- Products Attribute Leadership Strategy

Sedan 轻量化重量设计模型

标杆车信息		竞品车信息		开发车型信息	
迈腾		BMW 3系		--	
长(mm)	4865	长(mm)	4624	长(mm)	4956
宽(mm)	1820	宽(mm)	1811	宽(mm)	1860
高(mm)	1475	高(mm)	1454	高(mm)	1516
轴距(mm)	2812	轴距(mm)	2810	轴距(mm)	2850
整备质量(kg)	1545	整备质量(kg)	1470	整备质量*(kg)	1500
				整备质量**(kg)	1450

$$f(\rho) = \frac{M}{(k*(L-wh)+wh)*W*H}$$

\* 针对标杆车整备质量

\*\* 针对竞品车整备质量



## GEELY Contents

Why aluminum – Lightweight Technology

Geely PEV Project

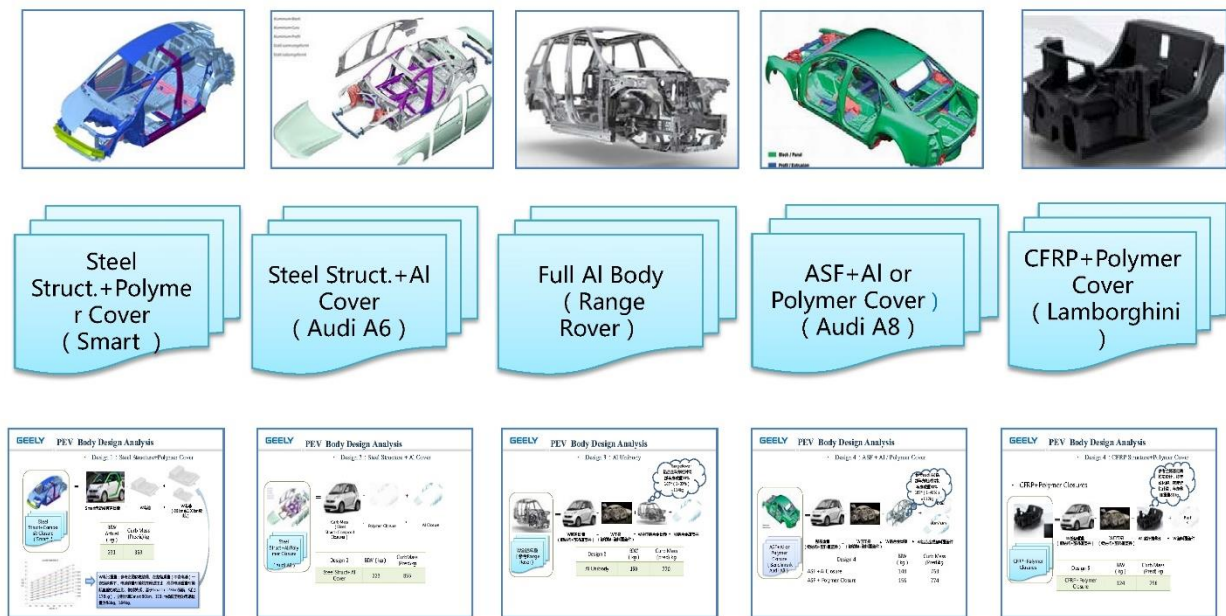
PEV Lightweight Target

**PEV Lightweight Technology Analysis**

Challenges

## GEELY PEV Lightweight Technology

### PEV Body Design Analysis



## GEELY PEV Lightweight Technology

### SEV Body Design Analysis

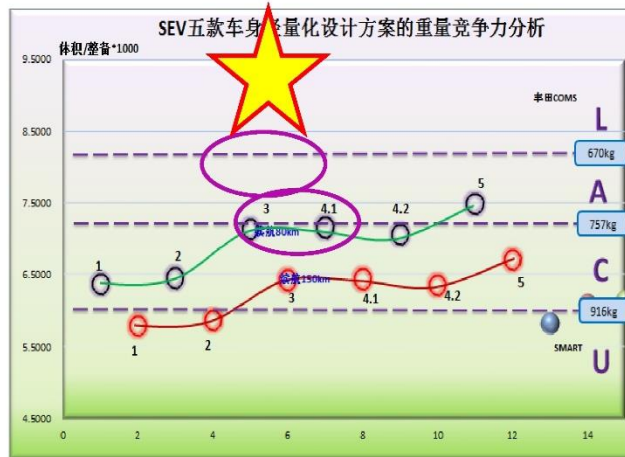
- Lightweight Design – Mass Analysis

#### BIW & Curb Mass Evaluation

No.	Body Design Method	Predic. BIW (kg)	Pred. Curb Mass ( kg )
1	Steel Struct.+Polymer Cover	231	863
2	Steel Struct.+Al Cover	223	855
3	Full Al Body	150	770
4	ASF+Al Cover	148	768
	ASF +Polymer Cover	156	774
5	CFRP+Polymer Cover	124	741

## GEELY PEV Lightweight Technology

### PAS Analysis



Based on the PALS analysis:

- ① Design 1 and 2 shown uncompetitiveness (Range U)
- ② Design 3, 4 and 5 shown the curb mass is among A or C.
- ③ Design 5 shown the curb mass is minimum, among leaders.

## GEELY PEV Lightweight Technology

### Lightweight Recommendation

Annual Production > 10000



Full Al Body

Project	Year	Material	Weight	Volume	Cost
Full Al	2015	Aluminum	1500	1.5	2250000
	2016	Aluminum	1500	1.5	2250000

Annual Production < 5000台



ASF+Al/Polymer

Body Design	Weight	Material	Volume	Cost
Design 1	1500	Aluminum	1.5	2250000
Design 2	1500	Aluminum	1.5	2250000

CFRP Design



CFRP+Polymer (Lamborghini)

Design	Material	Weight	Volume	Cost
Design 1	CFRP	1500	1.5	2250000
Design 2	CFRP	1500	1.5	2250000

Why aluminum – Lightweight Technology

Geely PEV Project

PEV Lightweight Target

PEV Lightweight Technology Analysis

**Challenges**

### Lightweight Design and Manufacturing Process

- Example 1: Aluminium Engine Hood

GEELY Al Engine Hood Cost Evaluation						
Cost Comparison between Al and Steel Engine Hoods						
	Al Engine Hood	OneTime Investment	Per Unit Cost	Steel Engine Hood	OneTime Investment	Per Unit Cost
<b>Mat.Cost</b>	Int. Panel		¥190.00	Int. Panel		¥87.00
	Ext. Panel		¥210.00	Ext. Panel		¥96.00
<b>Stamp Cost</b>	Tooling (RMB\$10K)	¥350.00	¥17.50	Tooling (RMB\$10K)	¥350.00	¥17.50
	Stamping(RMB\$)		¥0.80	Stamping(RMB\$)		¥0.80
<b>Joining</b>	Adhesive (RMB\$)		¥5.00	Adhesive (RMB\$)		¥5.00
	SPR (RMB\$)	¥20.00	¥1.00	Spot Welding (RMB\$)		¥3.00
	SPR Cost (RMB\$)		¥15.00			
<b>Coating</b>	Filter Equip.	¥2.00	¥0.10	No Change		
	F.		¥1.00			
	<b>Total (RMB)</b>		<b>¥440.40</b>	<b>Total (RMB)</b>		<b>¥209.30</b>

## GEELY Challenge

### Lightweight Design and Manufacturing Process

- Example 2: Aluminium Front Bumper

**GEELY**

#### Front Bumper Impact Result Comparison

Front Impact Results

	Longitudinal Beam Collapse (mm)	LB Energy Absorption (%)	L/R B Pillar Lower End Acceleration(g)	L/R Door Frame Deformation (mm)
Orig.(Steel)	425.8	36.60	34.20/34.70	0.817/2.732
Proposal 1	558.1	30.56	37.61/40.58	1.450/3.333
Proposal 2	455.5	36.89	36.93/40.28	1.255/3.126
Proposal 3	471.2	37.19	35.07/42.28	0.811/2.981

40% Offset Impact Results

	Longitudinal Beam Collapse (mm)	LB Energy Absorption (%)	L/R B Pillar Lower End Acceleration(g)	L/R Door Frame Deformation (mm)
Orig.(Steel)	619.5	15.20	35.16/40.49	35.620/10.310
Proposal 1	641.1	12.84	41.35/43.58	56.484/12.337
Proposal 2	634.0	15.45	46.3/40.54	41.597/13.844
Proposal 3	658.6	16.02	42.05/41.94	40.410/6.900

## GEELY Challenge





# We Welcome You To Our Next Event

**AluMag®**

**North America 2015** 9<sup>th</sup> - 11<sup>th</sup> of Nov  
 AUTOMOTIVE LIGHTWEIGHT  
**PROCUREMENT SYMPOSIUM**  
 Westin Hotel in Detroit, USA



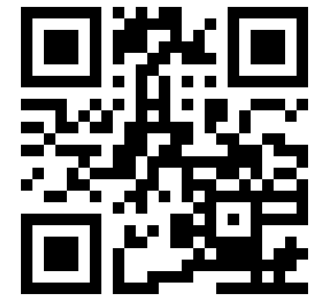
**AluMag®**

**AluMag SAE 2016** 12<sup>th</sup> - 14<sup>th</sup> April  
 Light Weighting - Emission Reduction - Car Comfort  
 Technology Center, Booth # 763 - Detroit - Cobo Center, MI USA



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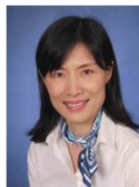
**Europe 2016** 27<sup>th</sup> - 29<sup>th</sup> of Nov  
 AUTOMOTIVE LIGHTWEIGHT  
**PROCUREMENT SYMPOSIUM**  
 Hilton Hotel in Duesseldorf, Germany



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