



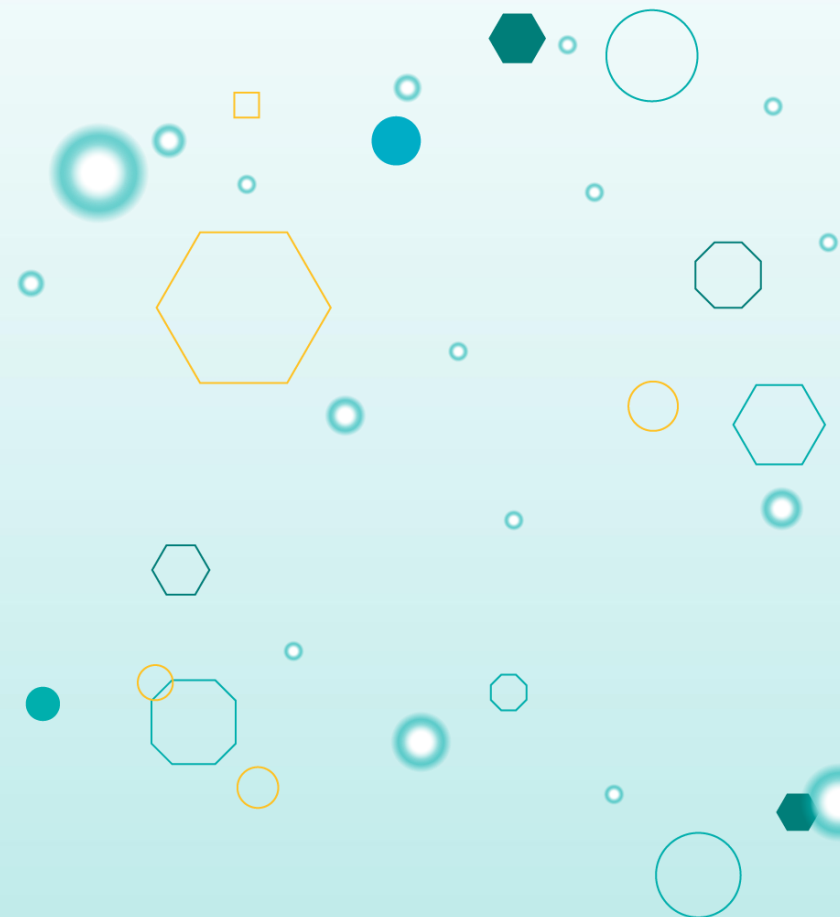
Engineering
工程

SOPHIE



開啟淨零, 可持續發展進程

**「新能源新世代2024」
可載人太陽能車(大車)
技術支援 網上直播**



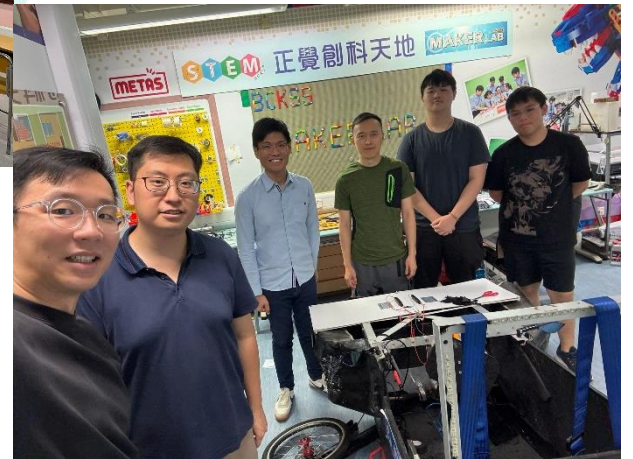
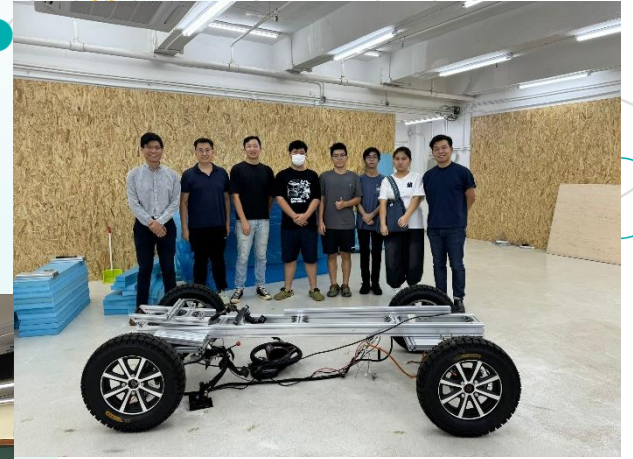
技術支援

- 車隊探訪 團隊總結
- 大車技術文件
- 賽前測試日



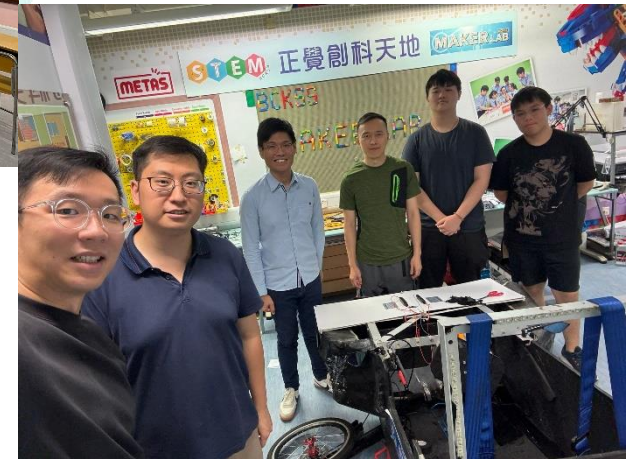
車隊探訪 團隊總結

- 大部份車隊準備理想, 都能夠買相關重要部件開始製作
- 電機部份:
 - 需要有電圖紙
 - BMS 及 相關說明書
 - 電壓需在48V 額定值 (包括馬達)
 - 太陽能板需在車頂
 - 電燈系統可以另外的副電提供能源



車隊探訪 團隊總結

- 機械部份:
 - 需有車門
 - 安全帶為5點
 - Rollbar & Bulkhead
 - Braking 需要有2套
- 整體安全:
 - 司機需16歲或以上
 - Driver log for >10 hr
 - Radio, Fire extinguisher



賽前測試日

賽前測試日

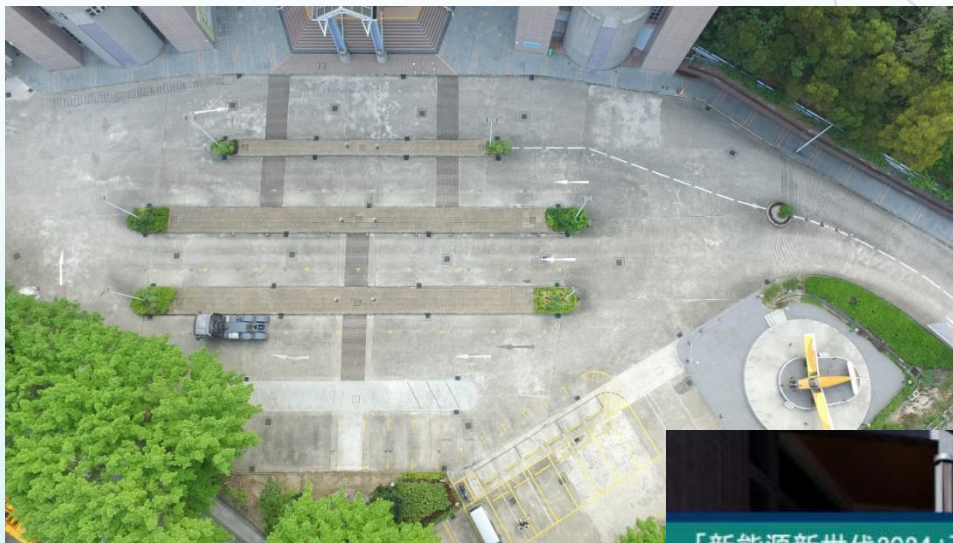
9月21日

上午8時 (開始進場)

至下午4時 (完結)

***上午9時**

開始拍團體照



General Vehicle Design

Characteristics:

- 3 or 4 wheels
- Upright seating of driver
- Road ready
- Lights

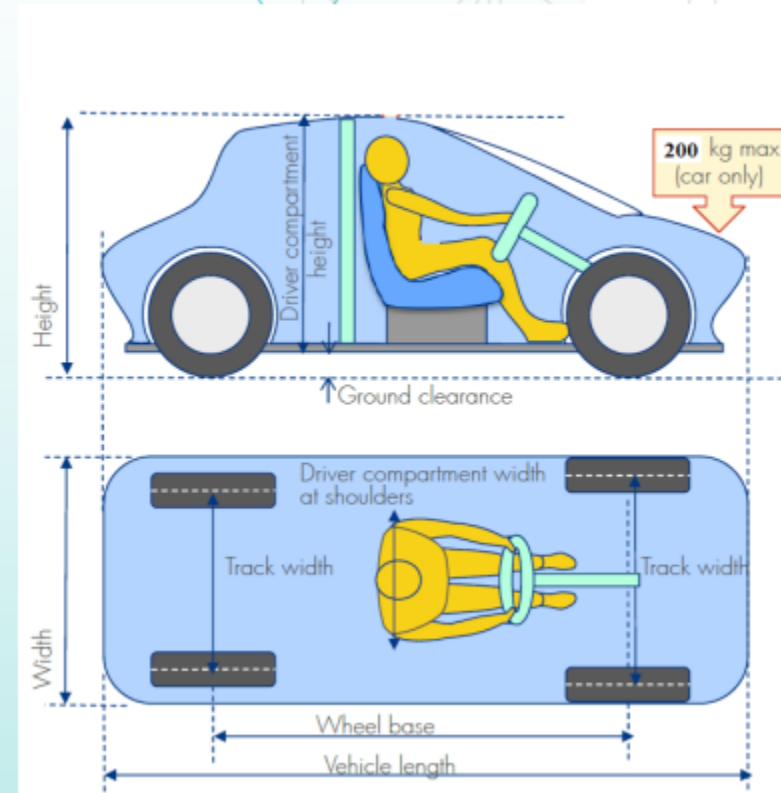


General Vehicle Design

Characteristics:

- 3 or 4 wheels
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- Lights

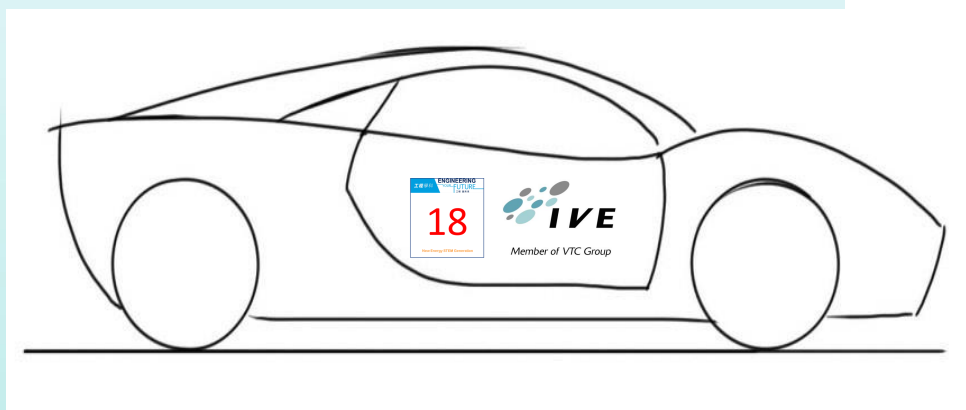
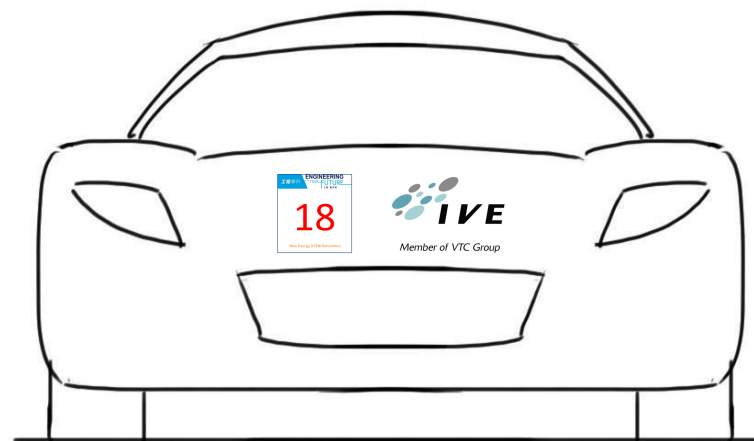
Dimension	Limits
Max. Height	1300mm
Max. Width	1300mm
Max. Length	3500mm
Track width	50% of width (for both front and rear), measured between the midpoints where the tyres touch the ground.
Wheelbase	>1200mm
Ground clearance	>100mm
Max. vehicle weight (without driver)	225 kg



Identification

For each side & front

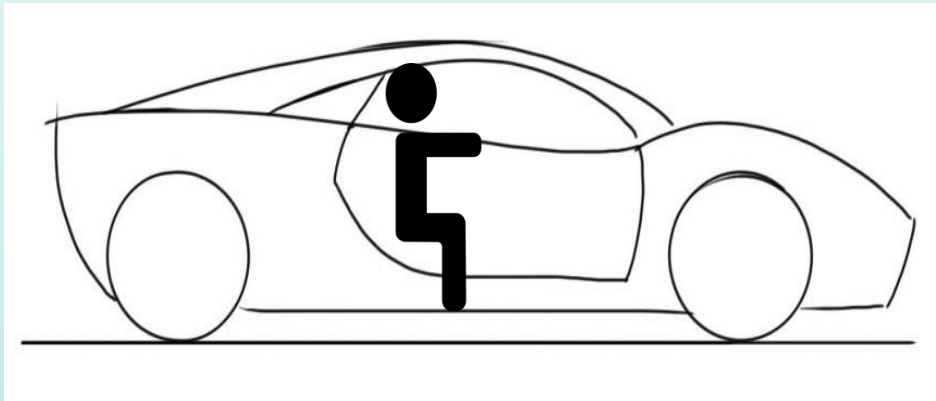
- IVE logo
- Racing sticker



General Vehicle Design

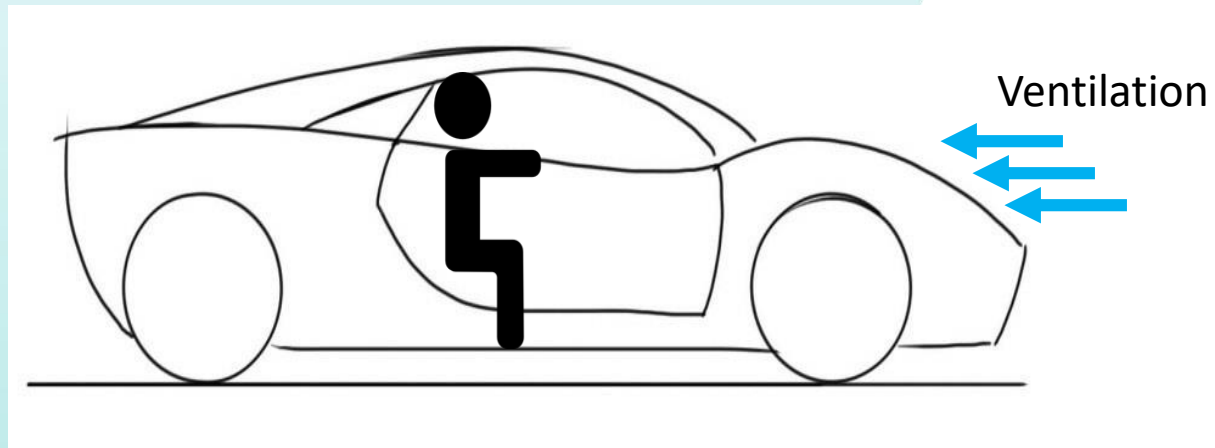
Driver weight

- in full driving gear – helmet, gloves, driving clothes, hands free drinking bottle;
- proper motorcycle helmet;
- Driver shall be the holder of valid Hong Kong driving license;
- gloves and shoes mandatory.



Driver Comfort

- Cockpit temperatures can reach 40°C (depending on vehicle design & weather);
- To avoid heat stress the following are recommended
 - good ventilation
 - drinking bottle for driver
 - sunscreen
- Driver preparation
 - keep well hydrated
 - don't drive on an empty stomach



Chassis/Monocoque Stability

2.13 Roll Bar

<p>a) The roll bar must extend in width beyond the driver's shoulders when seated in normal driving position with the safety belts fastened.</p> <p>Teams may use a tubular or panel roll bar. If a tubular roll bar is used, it must be metal. A panel roll bar is the rigid partition separating the cockpit from the energy compartment, and it must be integrated into the vehicle chassis or monocoque.</p>	<p>b) The roll bar must be able to withstand a static load of 700 N applied in a vertical, horizontal, and/or perpendicular direction, without deforming in any direction.</p>
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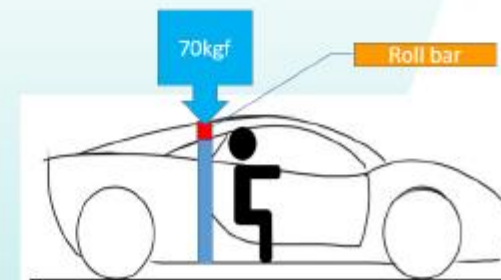
Safety belt checking



- Strength of safety belt will be checked
- Upward till 70kg registered on weighing scale
- Single buckle
- Check that 5 point safety belts are present

車架穩定性

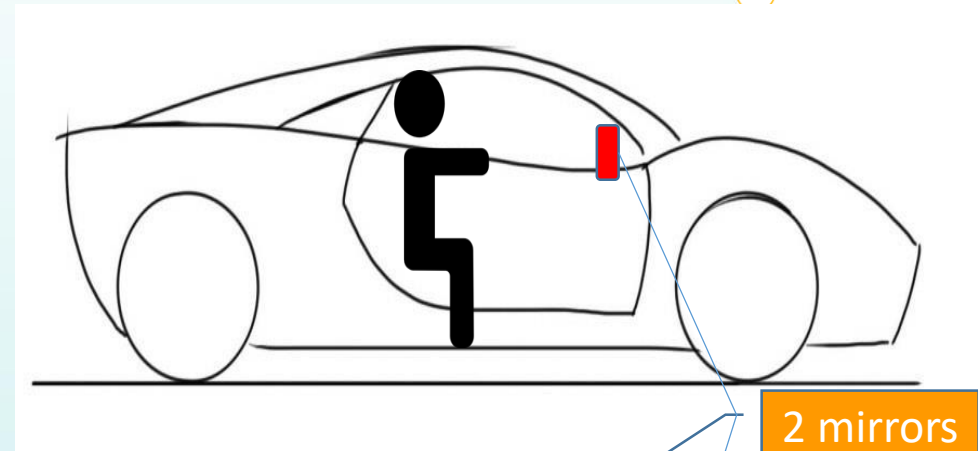
- Chassis / Monocoque
 - Must be solid
 - Wide and long enough to protect driver
- Roll bar
 - >50mm above helmet
 - extend beyond shoulders
 - withstand 70kgf



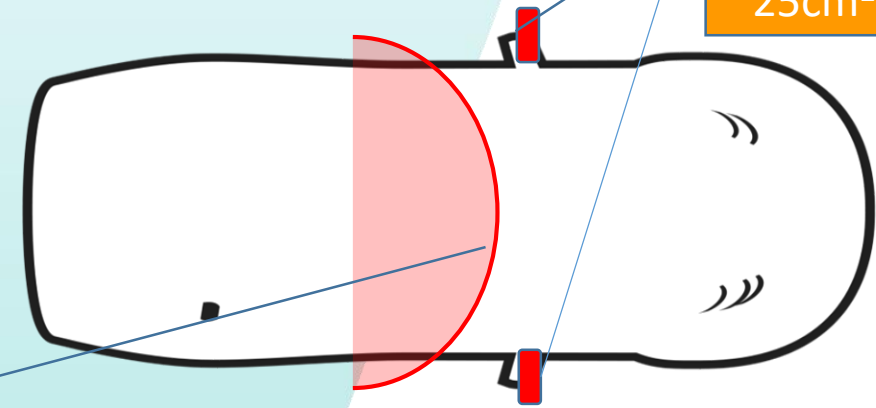
Visibility

Visibility

- 180° field of vision
 - seated with safety-belt and helmet on;
- 2 mirrors each of 25 cm² min



2 mirrors
25cm²



180° field of
vision



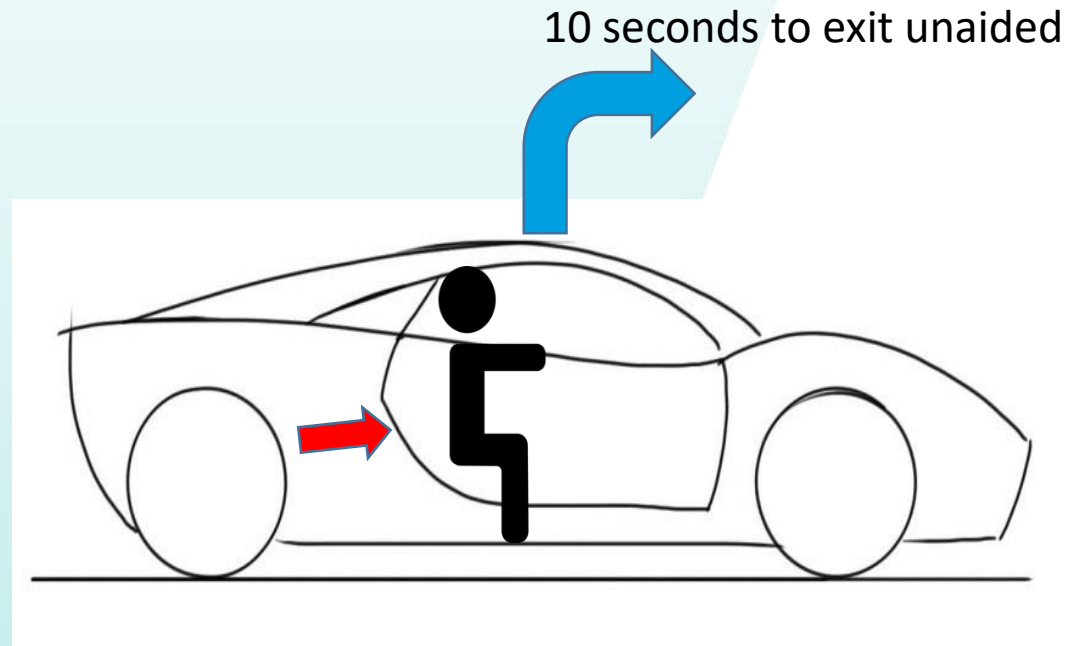
Vehicle Access

Exit

Driver must exit unaided in 10 seconds

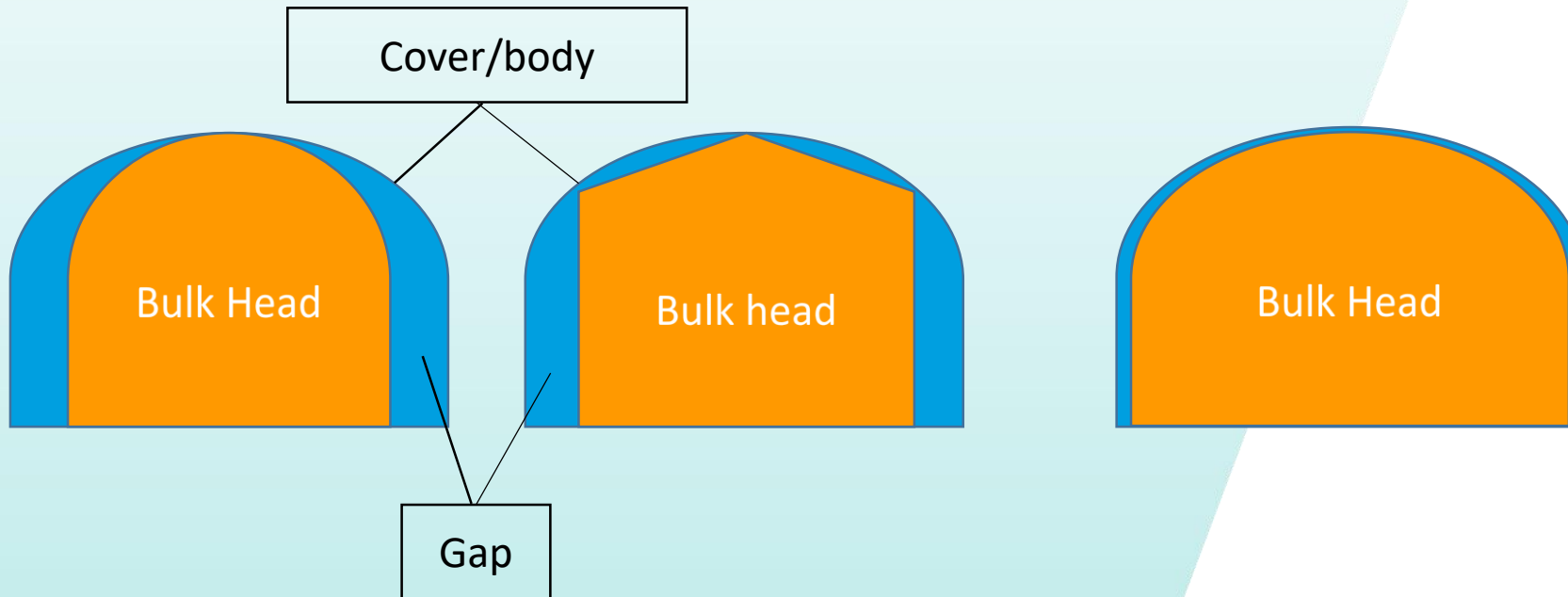
Doors

- Door/opening should be securely attached
- No adhesive tape allowed
- No tools required for opening
- Method of opening marked by red arrow on outside



Example of Bulkhead

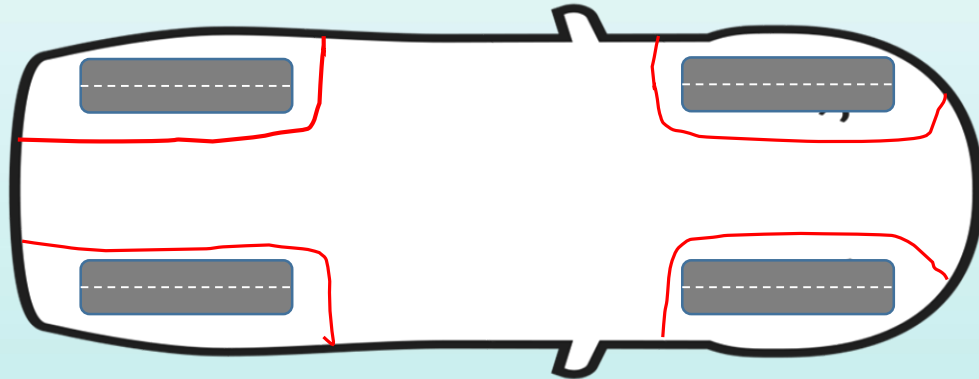
- The shape of the bulkhead should match shape of body/cover
- Gaps could be filled by foil or sealant



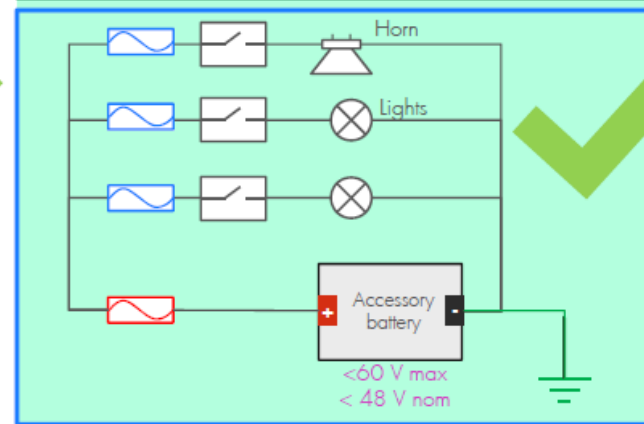
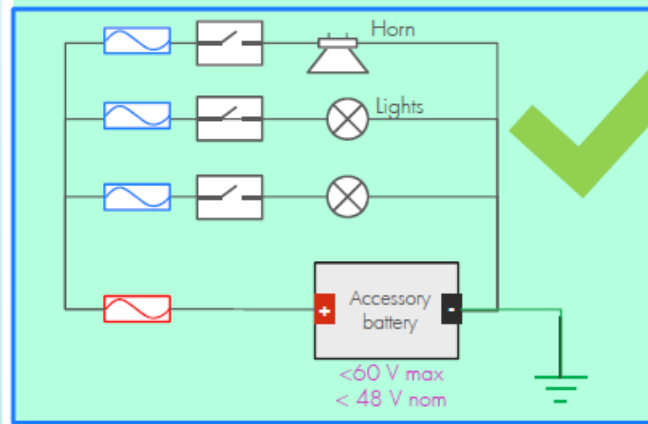
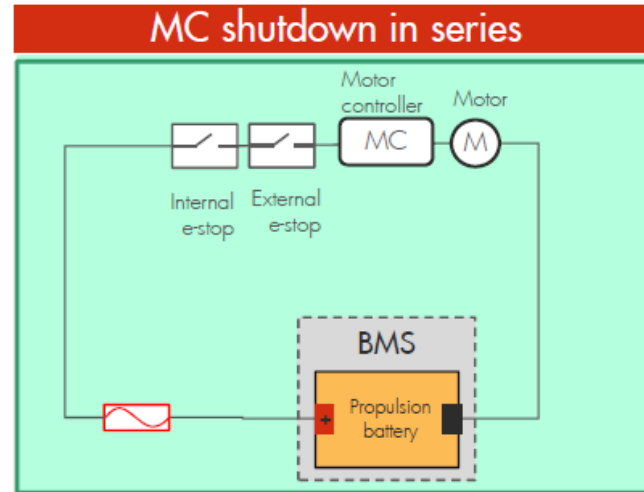
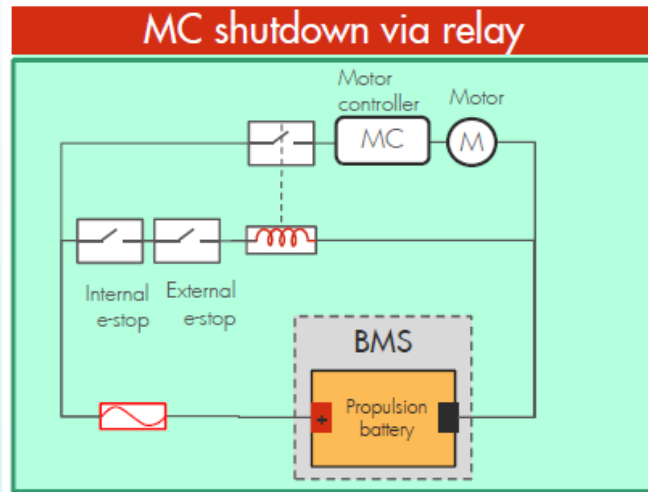
Driver Comfort

Wheel bulkhead

- isolate wheel from driver



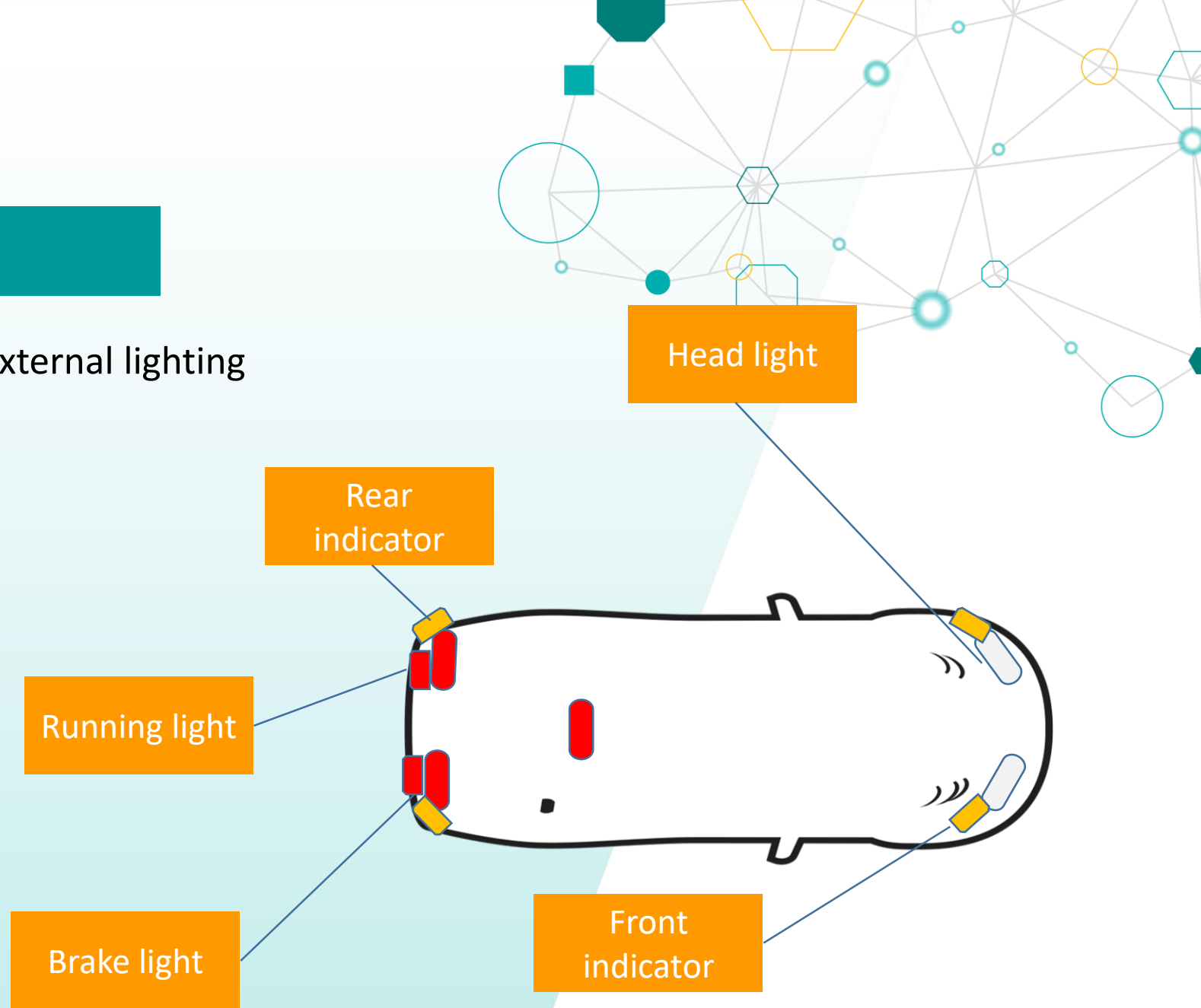
Emergency Shutdown Mechanism



Lighting

The vehicle must have a functional external lighting system, including:

- a) Two front headlights
- b) Two front turn indicators
- c) Two rear turn indicators
- d) Two red brake lights in the rear
- e) Two red rear running lights



Batteries

- Propulsion battery
- provide power to the power train
 - a BMS is needed for lithium batteries
- Accessory battery
- provide power to all safety devices such as, E-stop relay, Horn, lighting
 - cannot be used for cooling systems, electric motors
 - only one unit
- Single unit, 2 connections only (Applicable for all batteries)



Reception



Start point

Backdrop

1. Weighing drivers



2. Weighing cars



Parking lots



Emergency Track



Prize Display

6. Visibility checking



7. Electrical inspections



5. Safety Belt checking



3. Dimension checking



4. Brake Checking



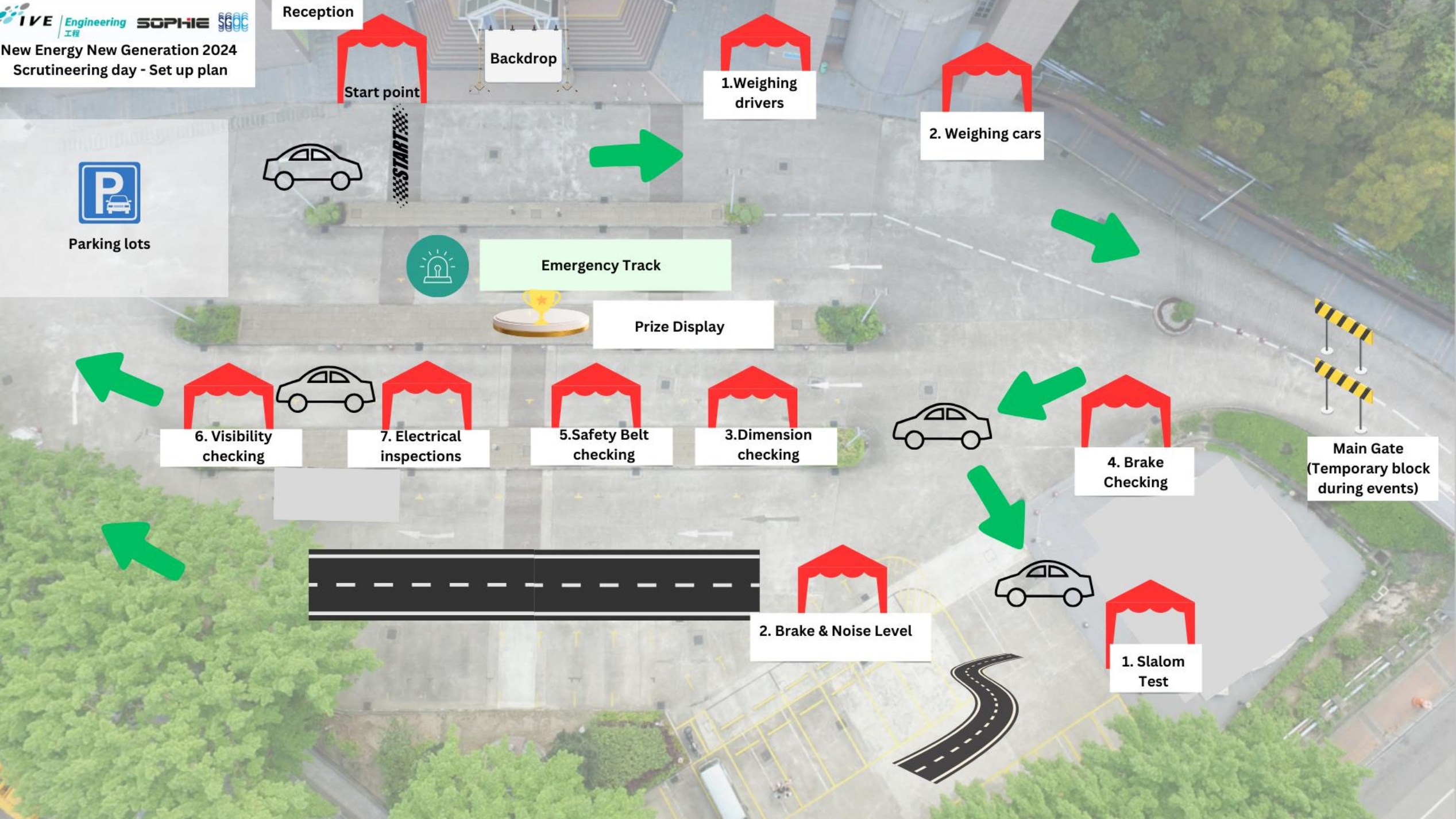
2. Brake & Noise Level



1. Slalom Test



Main Gate
(Temporary block during events)



Pre-inspection Checklist

Bring:

- Your car
- Electrical system diagram
- Safety glasses
- Safety gloves
- Drivers (Helmet, gloves)
- Tools

Ensure:

- Attendance of briefing and daily update





Activities in Scrutineering Area

Static Scrutineering - 1

1. Weighing drivers (5min)	2. Weighing cars (10min)
3. Dimension checking(10min)	4. Brake checking(15min)
5. Safety belt checking (15min)	6. Visibility checking(15min)
7. Electrical Inspection(15min)	

Dynamic Scrutineering - 2

1. Slalom test(15min)	2. Brake & Noise Level Testing(30min)
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Record and Result Center - 3

Recording inspection details Input of measurement results	Checking validity of runs
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Driver	
Car	
Dimensions	
Brakes	1
Safety belt	
Visibility	
Inspection	
Slalom	
Brake	2
Noise	
Records	3



Static Scrutineering - 1

Weighing drivers

- All drivers will be weighed (with suit, helmet, shoes, and gloves)
- Two drivers are required.



Passport

 ENGINEERING YOUR FUTURE <small>工程 創未來</small>		 新能源STEM世代 New Energy STEM Generation <small>Member of VTC Group VTC 創未來</small>	
Team No.:		Driver 1:	
Manager:		Driver 2:	
Contact no.:			
Scrutineering Check list			
Static Scrutineering			
S1 Weighing Driver (kg) Pass:		S5 Pass:	
Driver 1	<input type="text"/>	Safety belt checking	<input type="checkbox"/>
Driver 2	<input type="text"/>		
S2 Weighing Car(kg)		S6	
Car	<input type="text"/>	Visibility checking	<input type="checkbox"/>
S3 Dimension (cm) Pass:		S7 Pass:	
Length	<input type="text"/>	Electrical inspections	<input type="checkbox"/>
Width	<input type="text"/>		
Height	<input type="text"/>		
S4			
Brake checking		<input type="checkbox"/>	
Dynamic Scrutineering			
D1 Pass:		D2 Pass:	
Slalom Test	<input type="checkbox"/>	i) Brake Testing	<input type="checkbox"/>
		ii) Noise Level Testing	<input type="checkbox"/>

Static Scrutineering - 2

Weighing cars

- Car weight will be determined with portable scales
- Team to lift car onto the scales



Static Scrutineering - 3

Dimension	Limits
Max. Height	1300mm
Max. Width	1300mm
Max. Length	3500mm
Track width	50% of width (for both front and rear), measured between the midpoints where the tyres touch the ground.
Wheelbase	>1200mm
Ground clearance	>100mm
Max. vehicle weight (without driver)	225 kg



Static Scrutineering - 4

Brake checking

- Check that front and back brakes work independently
- Car with driver will be stop on ramp area
- Car should not slide down
- Slope $\sim 20\%$ (20:100)



Static Scrutineering - 5

Safety belt checking



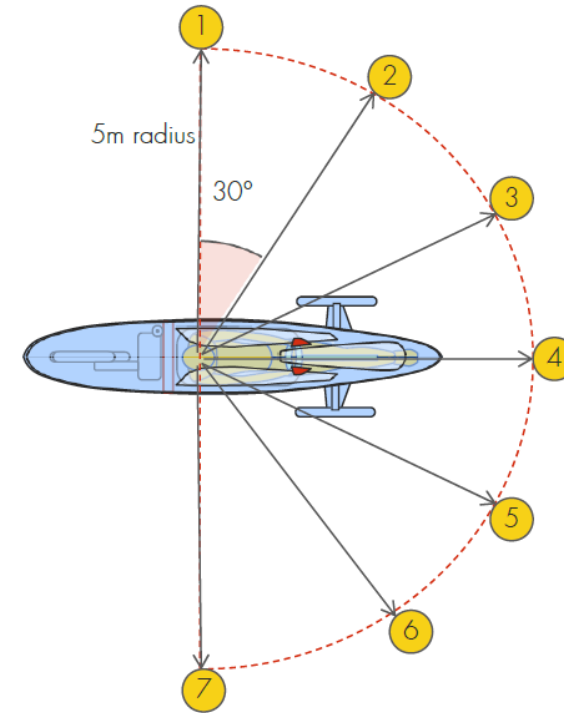
- Strength of safety belt will be checked
- Upward till 70kg registered on weighing scale
- Single buckle
- Check that 5 point safety belts are present



Static Scrutineering - 6

Visibility checking

180° Visibility Check & Mirror Check



Static Scrutineering - 7

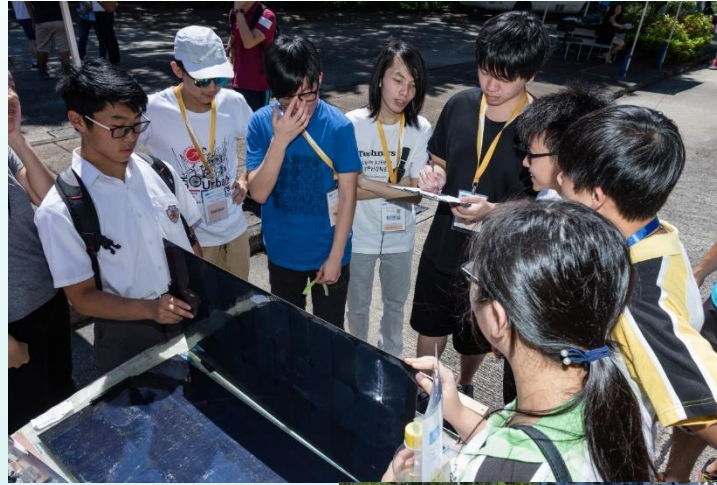
Electrical Inspection

Checking of electrical systems:

- Batteries
- Wiring
- Fuses
- Electrical circuits
- Horn
- Lights

General inspections:

- Bulkheads
- Fire extinguisher
- Check stickers/logos



Dynamic Scrutineering - 1

Slalom test

- Check that driver can control the vehicle properly by navigating a slalom course
- Check that E-stop works

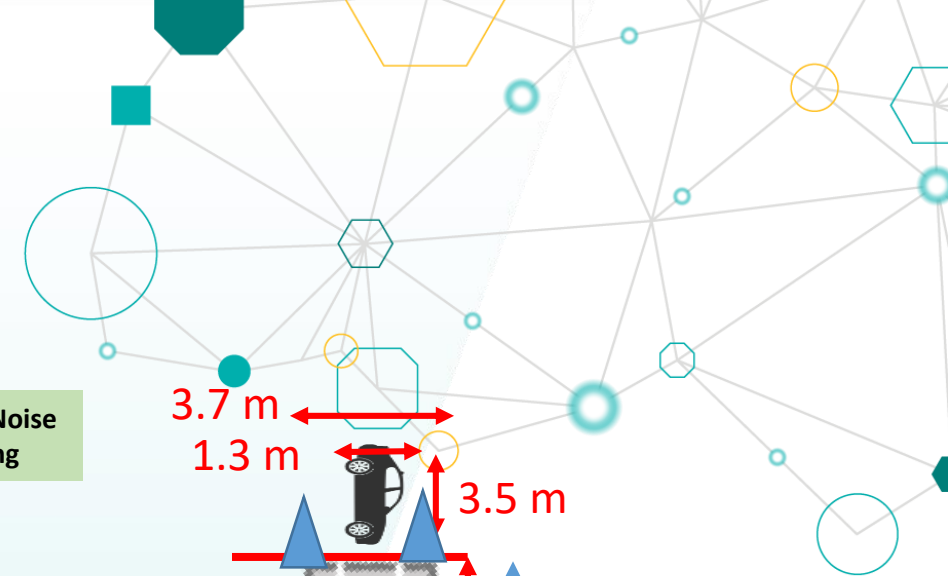


Dynamic Scrutineering - 2

Brake & Noise Level Testing

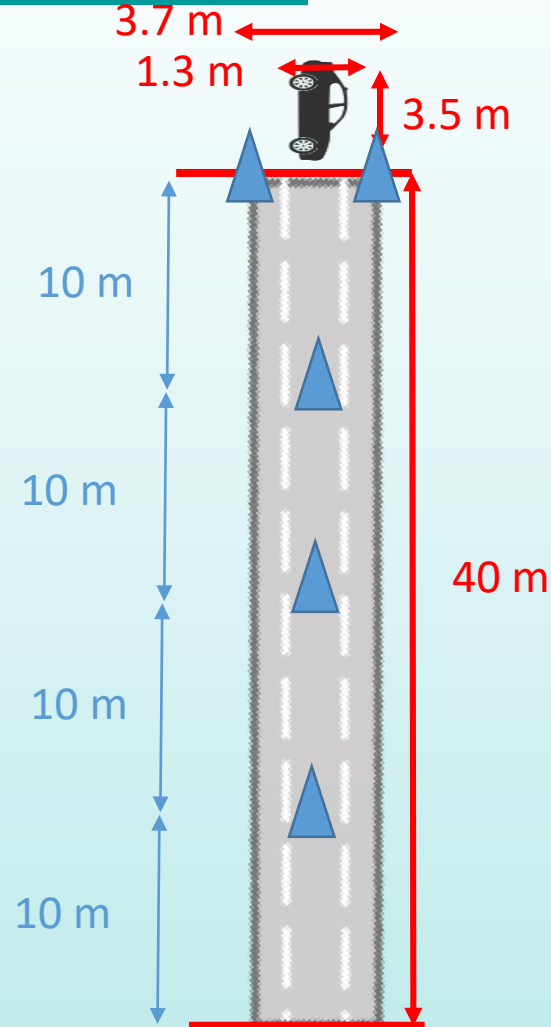
- Checking that driver can stop the car while travelling at speed (10km/h)
- Check the noise level of the car <90dB at 4 meter



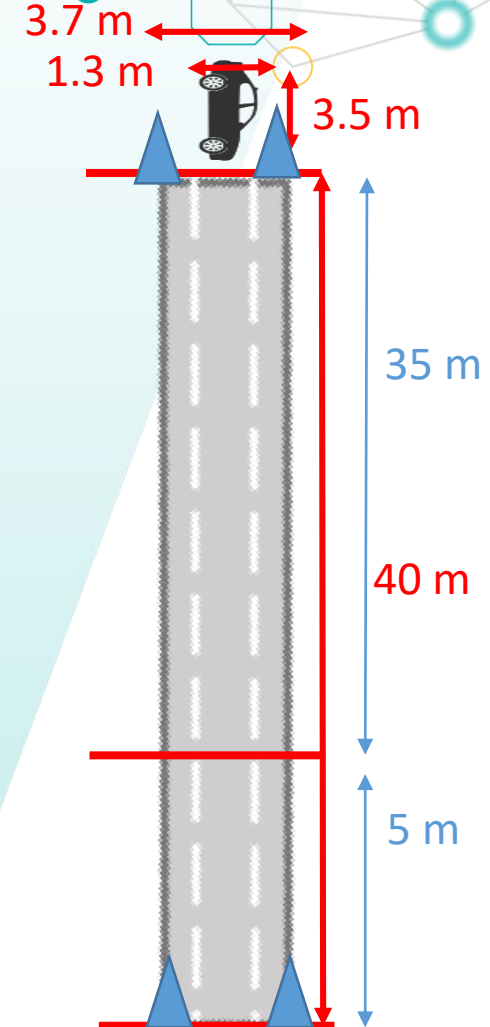


Scrutineering day

1. Slalom test



2. Brake & Noise Level Testing



Race track analysis

比賽

- 獎項：
 - ✓ Energy Efficiency Award
 - ✓ Time Record Award
 - ✓ Overall Championship
 - ✓ Safety Award
 - ✓ Technical Innovation Award
 - ✓ Environmental- friendly Design Award
 - ✓ Appearance Design Award
 - ✓ Team Spirit Award
 - ✓ Team Wear Design Award

每組可於指定時間內行走 **3** 轉;

每轉 **2** 個圈;

每轉必須於指定地點停車 **1** 次 (停車時間10秒).










Event day – Race Format

Racetrack Manager

- Responsible to maintain the racetrack operation, and ensure the racetrack safety
- determining whether or not to suspend a race in case of dangerous
- Direct and lead the team car in correct position by showing the Flags

	YELLOW FLAG Caution on track. No passing allowed.
	GREEN FLAG Signal to start the race
	CHECKERED FLAG End of race, arrival at the finish line.
	RED FLAG Mandatory stop under the orders of race management.
	BLUE FLAG Indicates overtaking, please give way.



Programme – Briefings / Familiarization

Time:	08:00	08:30	08:45	09:00	09:15	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00							
Scrutineering session 21/9/2024 Sat.	R	iB	Photo	Scrutineering														TC										
Final 12/10/2024 Sat.	R	DU	Final														TC											
* Remark																												
iB = Initial Briefing	DU = Daily update																											
TC = Track Closed	R = Registration																											
The organizer has the right to make changes to the schedule during the event in the interest of driver safety																												

Tips

To avoid disappointment:

- Car should be tested and ready for technical inspection on arrival

Bring

- Tools
- Batteries
- Personal protective equipment

Thanks
GOOD LUCK!



完

