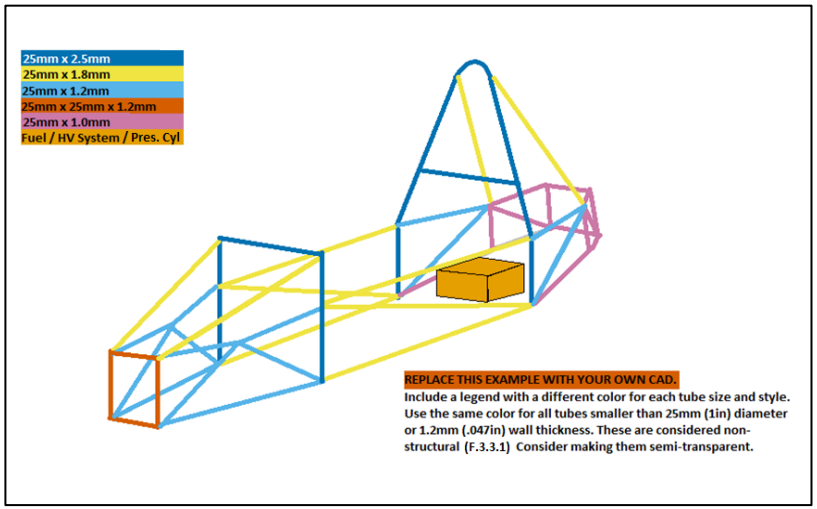
2020 SES Inspection

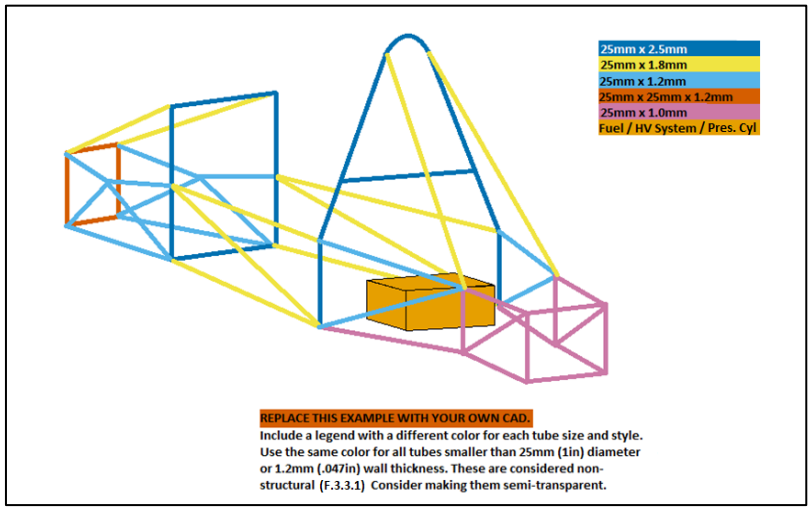
Precautions for EV

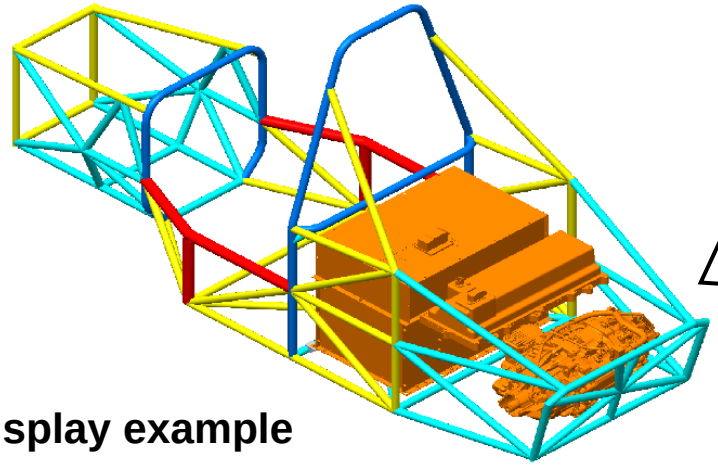
SES = Structural Equivalency Spreadsheet

About the display of HV Systems

Show accumulator installation/removal.
Use different colors for square and round.
Include a legend that shows each color and size.
Fuel tank, HV systems, pressurized tanks shown in orange.







Display example

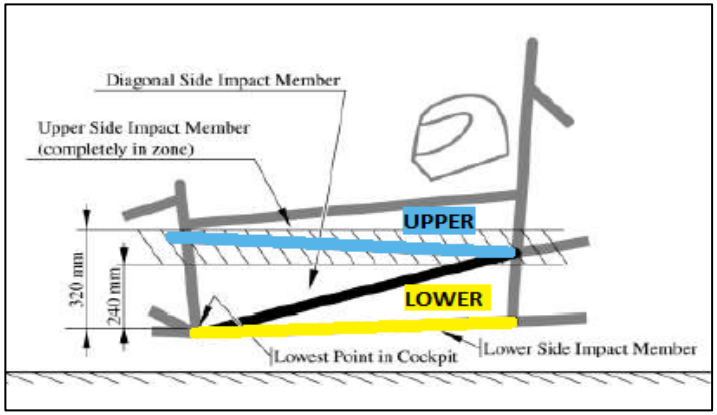
Described required as HV systems

- Accumulator Container
- Inverter System
- Tractive System

Display all of these

Accumulator Side Protection

The need for protection is based on the height of the Upper Side Impact Member.



F.11.2.1
All Accumulator Containers must be protected from side impact or rear impact by Side Impact Structure (**F.6.4**, **F.7.6**, or Equivalent)

- The Accumulator Container must not form part of the equivalent structure.

Accumulator Container must be within the height of Major Structure.

Fig.1 is according to the rules.

If the Accumulator Container is higher than the Major Structure, protect the protruding part with a triangular structure as shown in Fig.2.
(The red line is an example)

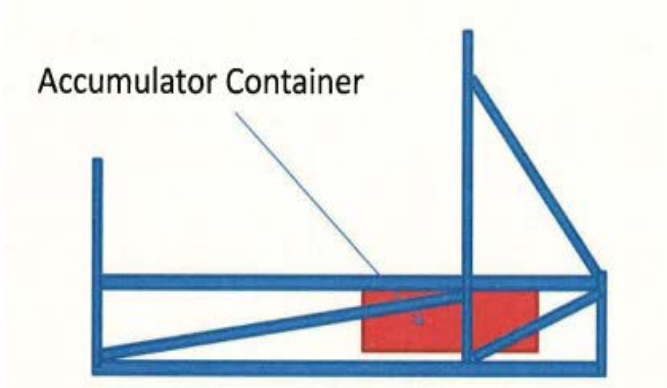


Fig.1

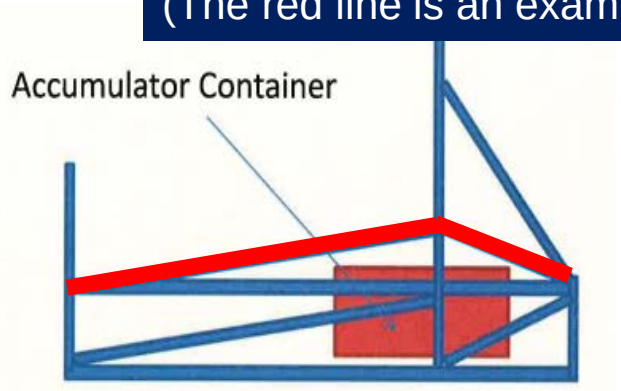


Fig.2

Attention : Accumulator Side Protection

The need for protection is based on the height of the Upper Side Impact Member

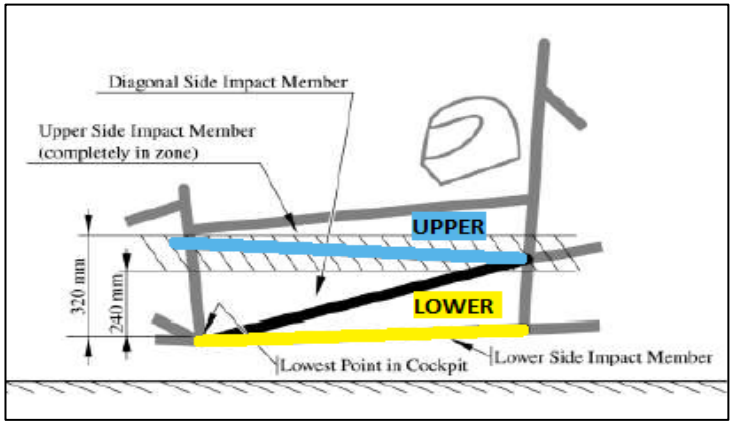
Note: SES sheet is incorrect

BLANK

EV Accumulator Side Protection

F.11.1.1 **F.1.1j** Accumulators must be within the Primary Structure.
F.11.2.1 Accumulator protection tubes are part of the Primary Structure

F.11.2.1 From the side, below 350mm the accumulator must be protected with:
1. An upper tube, generally not above Upper SIS height or below the top of the accumulator.
2. A lower tube meeting F.11.1.1.
3. A diagonal tube or tubes completely triangulating the upper and lower tubes.



Rules original

F.11.2.1
All Accumulator Containers must be protected from side impact or rear impact by Side Impact Structure (**F.6.4**, **F.7.6**, or Equivalent)

- The Accumulator Container must not form part of the equivalent structure.

Tractive Side Protection

The need for Protection is based on a height of 350mm from the ground

Note: SES sheet is consistent with the rules

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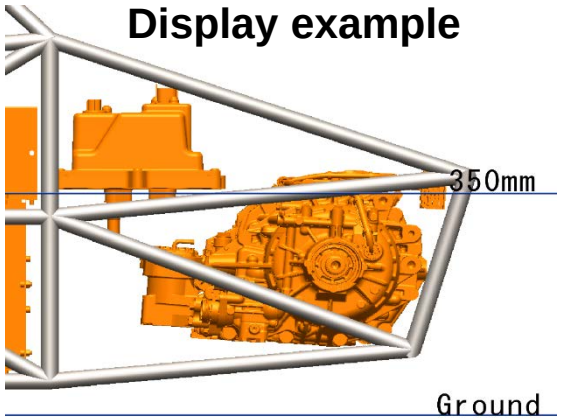
EV Tractive Side Protection

F.11.1.3 **F.1.1l** HV Components must be within the Rollover Protection Envelope.
F.11.1.2 Outboard wheel motors are the only exception.

F.11.2.3 - From the side, below 350mm, the tractive HV components must be protected with:
1. An upper tube, generally not above Upper SIS height or below the top of a motor at axle level.
2. A lower tube.
3. A diagonal tube or tubes completely triangulating the upper and lower tubes.

Display example



Rules original

F.11.2.3
Tractive System parts in a position below 350 mm from the ground must be:

a. Protected from:
- Side impact
- Rear impact
- Intrusion by non-crushable objects (such as a differential)

b. Protected by structure meeting F.5.13 Component Protection

Rear Impact Protection

The choice is divided between Tractive Rear Impact Protection and Accumulator Rear Impact Protection.

F.11.2.3	Your motor or diff could fit between the acc.and rear impact?		Yes
	Tractive Rear Impact Protection	**Minimum**	**Tube Used**
F.3.2.1	Example: 25.4mm x 1.2mm round	Size C	Round

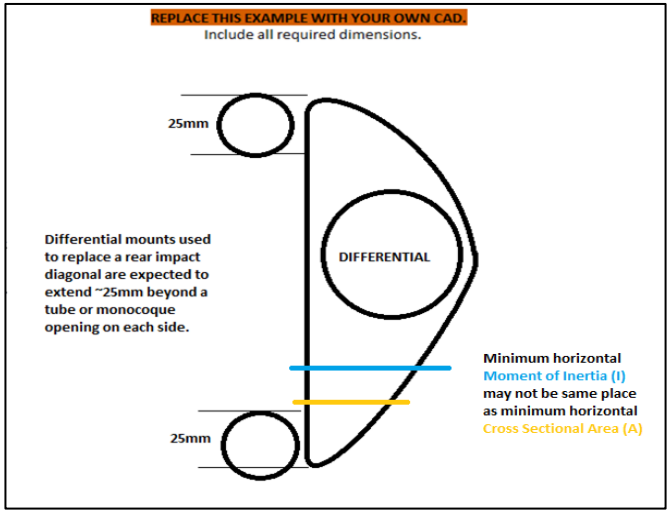
F.11.2.3	**Rear Impact Diagonal:**		Differential Mounts
	Tractive Rear Impact Protection	**Minimum**	**Tube Used**

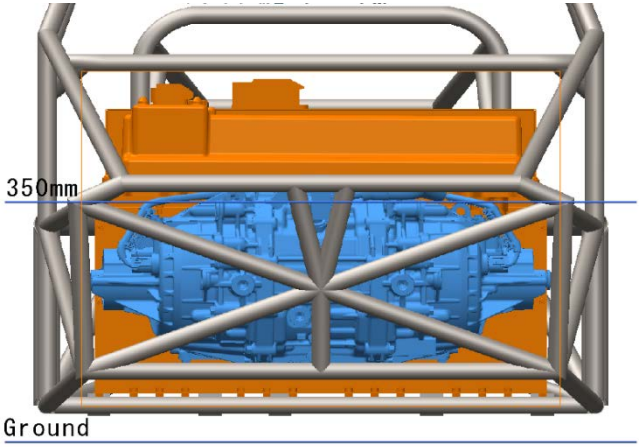
F.11.2.3	**Rear Impact Diagonal:**		Tube
	Tractive Rear Impact Protection	**Minimum**	**Tube Used**

F.11.2.1	Your motor or diff could fit between the acc.and rear impact?		No
	Accumulator Rear Impact Protection	**Minimum**	**Tube Used**
F.3.2.1	Example: 25.4mm x 1.6mm round	Size B	Round

F.11.2.1	**Rear Impact Diagonal:**		Differential Mounts
	Accumulator Rear Impact Protection	**Minimum**	**Tube Used**

F.11.2.1	**Rear Impact Diagonal:**		Tube
	Accumulator Rear Impact Protection	**Minimum**	**Tube Used**
F.3.2.1	Example: 25.4mm x 1.6mm round	Size C	Round





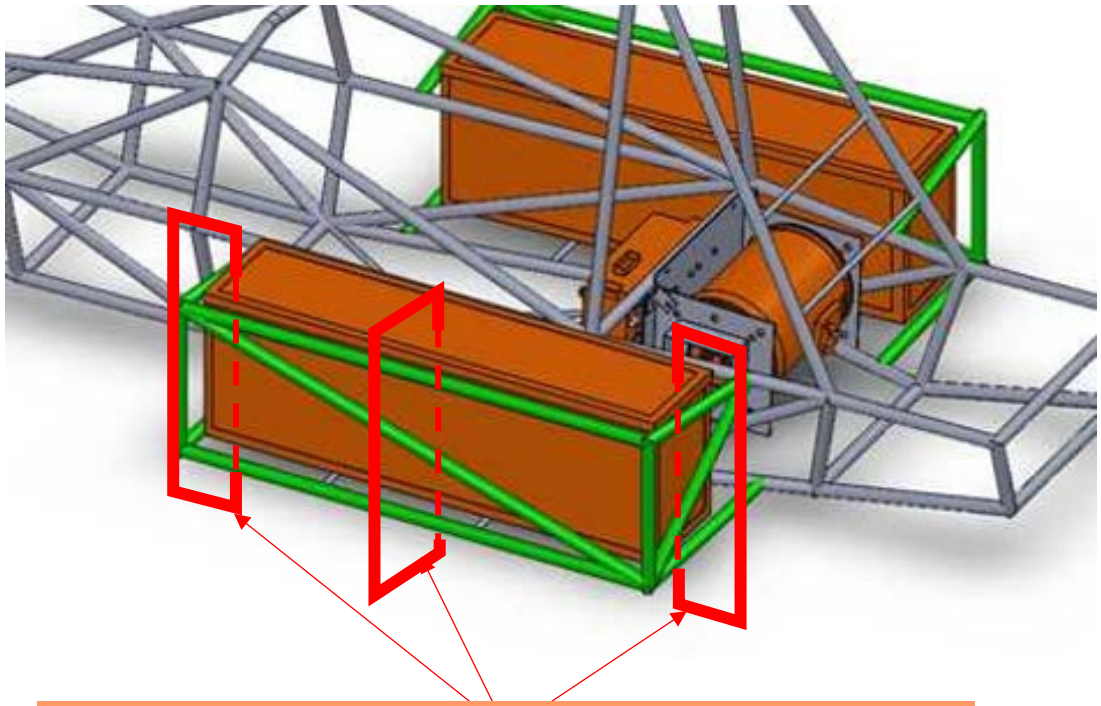
Display example

Protection Strength Calculation

Accumulator & Tractive System Protection

Protections should be considered as Side Impact Structure equivalent.

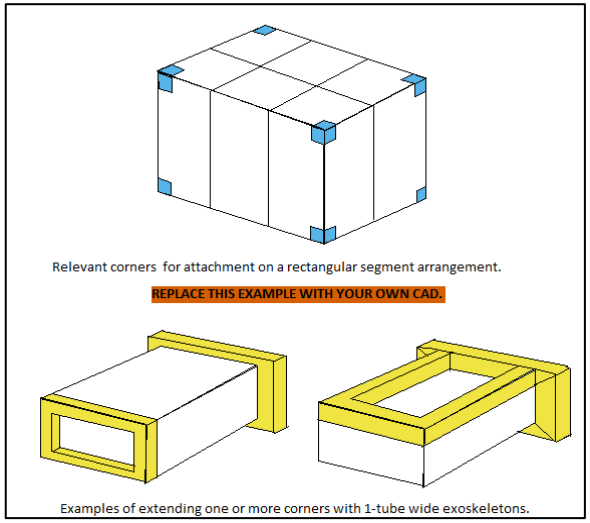
You calculate in the composition pipe of the weakest perpendicular section.

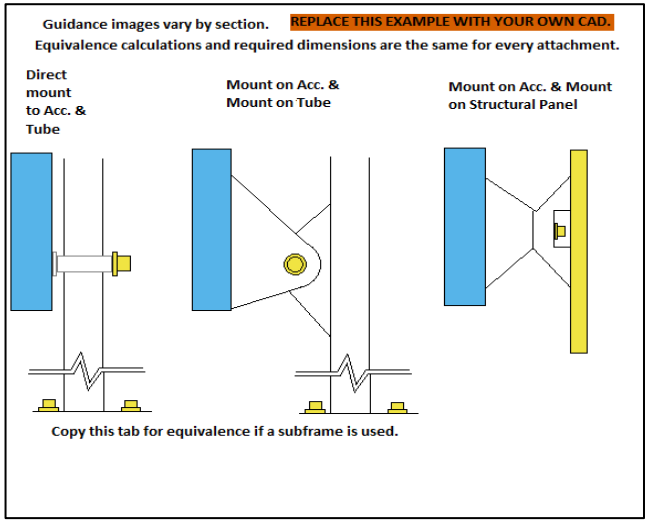


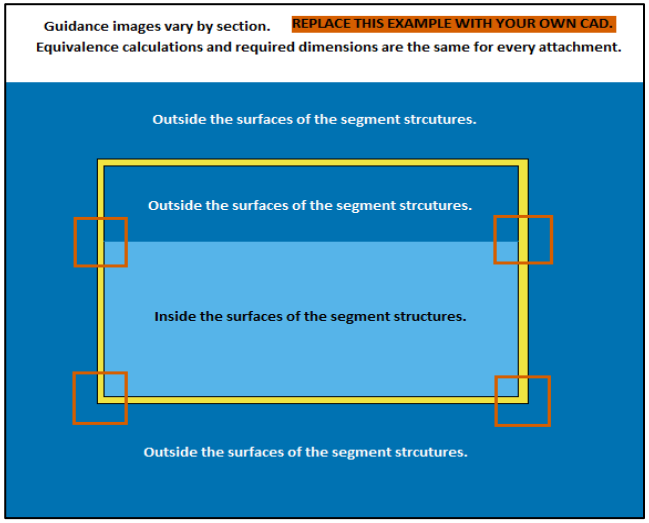
Tube number should be counted in the weakest cross-section

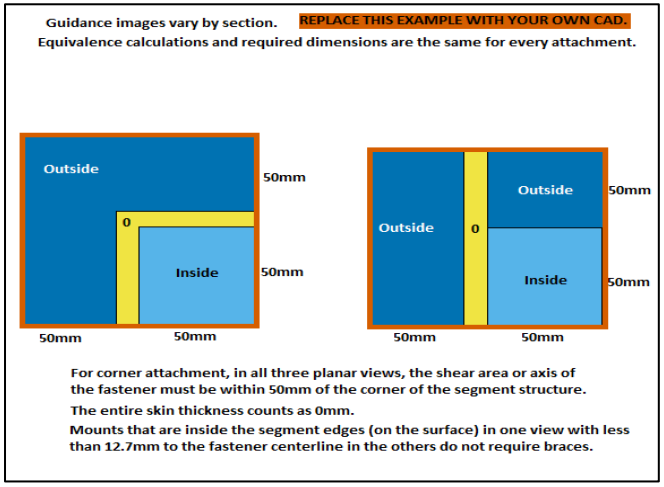
Display of EV Accumulator

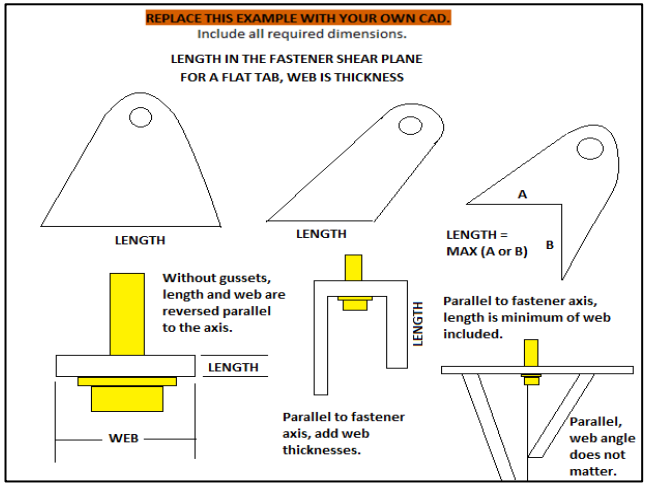
For EV Accumulator, describe correctly referring to the illustration.

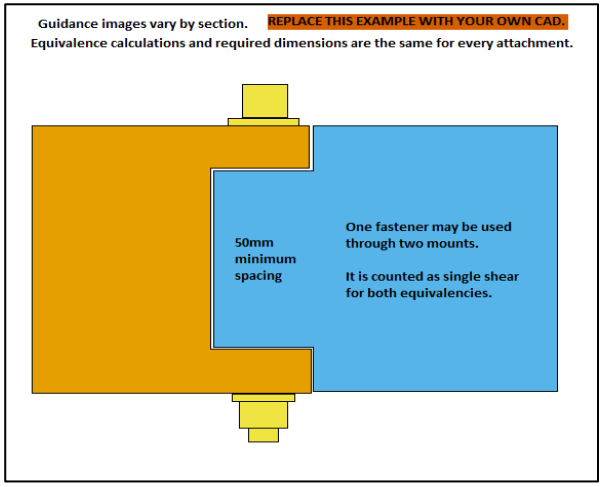












About Accumulator Segment

The following rules are the criteria for the Accumulator Segment.
Confirm consistency with separately registered ESF.

① EV.3.1.2	Maximum segment voltage:
② EV.3.1.2	Nominal segment capacity:
③ EV.1.3.2	Maximum accumulator voltage:

BLANK				
	Cell type:	Cylindrical		EQ
	Maximum Voltage:		V	BLANK
	Nominal Voltage:		V	BLANK
	Nominal Capacity:		mAh	BLANK
	Maximum segment cells in series:			BLANK
	Maximum segment cells in parallel:			BLANK
EV.4.1.2	Maximum segment voltage:	0	V	EQ
EV.4.1.2	Nominal segment capacity:	0	MJ	EQ
	Total accumulator cells in series:			BLANK
	Total accumulator cells in parallel:			BLANK
EV.1.3.2	Maximum accumulator voltage:	0	V	EQ
	Nominal accumulator capacity:	0	kWh	EQ
BLANK				
F.10.2.3 **Cell mounting and bracing material:**	E:		Pa	BLANK
	UTS:		Pa	BLANK
	Shear:		Pa	BLANK
	Assembled Segment moment of inertia, Lateral cross section:		**mm^4**	BLANK
	Assembled Segment moment, Longitudinal cross section:		**mm^4**	BLANK
	Maximum segment length:		mm	BLANK
	Maximum segment width:		mm	BLANK
	Maximum segment height:		mm	BLANK
BLANK				
F.10.2.3 **Restraint Method:**	Examples: Bolted, Friction, Adhesive			BLANK