Bus Australia Network Submission: Vehicle Standards and Safety

Bus Industry Confederation

AUGUST 2019

Contents

Overview of the Bus Industry Confederation

The BIC represents the interests of the bus and coach operators, manufacturers and suppliers to the industry in Australia.

The BIC Objectives are to:

- promote the development and viability of the bus and coach industry in Australia
- foster public understanding of the contribution made by the bus and coach industry to Australia's economy, society and environment
- promote and support industry related research and development
- promote the use of public transport as a viable alternative to the motor car
- promote policies and actions that are environmentally responsible
- encourage investment in public transport infrastructure
- foster and promote a viable Australian bus manufacturing industry.

The Bus Australia Network

The *Bus Australia Network* (BAN) consists of the bus associations of New South Wales, Victoria, Queensland, Tasmania, South Australia and Western Australia and the federal representative body, the *Bus Industry Confederation* (BIC).

The BIC and State Association members carry more than 1.5 billion urban public transport passengers per year and makes up 5 per cent of the total urban passenger task. The coach sector of the bus industry, comprising long distance, tourist and charter operators moves more than 1.5 million domestic travellers and makes up 8 per cent of the total non-urban passenger task. The school bus is the second most popular mode for travel to school after the car with about one quarter of all school children traveling to school by bus.

The Bus Industry, which includes bus operators, bus manufacturers and parts and service suppliers, employs more than 50,000 people nationally. The BAN promotes the efficient and sustainable growth of public transport in Australia as well as the benefits of bus and coach transport.

Generally, the bus and coach industry is divided between the contracted sector (bus operators who have a contract with a relevant State or Territory Government to provide regular passenger or school bus services) and the non-contracted sector which undertakes long distance, tourist and charter services. In most states and territories bus and coach operators must be accredited to undertake public passenger services, irrespective of the type of bus service being provided.

There is some overlap between the two sectors of the industry. For example, some contracted bus operators also undertake charter work. The industry also includes new types of bus transport; for example, “On-Demand” bus services are currently being trialled in NSW and are included in some new contracts; and in Victoria, the industry is taking a lead with such services through the introduction of a demand responsive transport booking platform.

There is also a significant variation in the size of operators within each sector. The contracted sector can involve metropolitan operators with more than 1,000 buses and rural operators with one school bus. Likewise, in the long distance, tourist and charter sector, there are operators with vehicle numbers ranging from one to several hundred.

Therefore, in addition to a significant difference between a truck and a bus, there are also differences within the bus and coach sector that requires consideration when reviewing the HVNL.

The Review of NHVL – General Comments

a) The NHVL should recognise that one size does not fit all when it comes to HV law – different sectors have different needs – NHVL needs to recognise the difference between truck and bus and the task undertaken including technical issues with vehicles and contracted operations – including specific recognition of a national minimum safety standard for accreditation for buses and coaches.

b) The NHVL needs to have a stronger performance and risk-based approach, that provides operational flexibility, is less prescriptive and offers performance based /alternative compliance approaches for operators to meet the law. This should include incentives to do so and recognise good compliance performance. This should include greater acceptance of technology as a compliance tool – The NHVL should not prescribe the technology only the compliance performance outcome and establish an appropriate alternative compliance enforcement regime that allows on road enforcement resources to be better targeted and for good operators to get on with the job.

c) The NHVL maintenance group is unnecessary –the law should be allowed to work and not be under constant scrutiny and review (generally by jurisdictions) where there are issues raised or problems, due to things like idiosyncratic industry operational needs or state differences. This would be better dealt with through NHVR and specific regulation to address these types of issues. The NHVL maintenance group is a contributing factor to promulgating state by state HV laws and undermining national uniformity.

d) The NHVL should be considered, when it comes to buses, in the context of the future passenger task and future impacts on the task such as population growth and congestion and automation and the efficient functioning, for example, of cities and the transport network and not in isolation of these broader societal outcomes.

e) The NHVL should become more focussed on the use of technology to manage legal access by different productive vehicles to use the road network – the current arrangements are inadequate in managing and monitoring access.

f) A PBS system for buses is required. The current PBS system is not suitable for buses, it limits productivity for buses and adds costs because it is based on “old school paradigms” about infrastructure, safety, environment rather than an approach that focusses on productivity and positive societal outcomes that passenger transport can deliver.

g) Existing exemptions to the NHVL should be retained and only reviewed in the context of adoption nationally as part of the NHVL review.

In terms of our submission, the BAN has prepared a response to each of the seven (7) questions posed in the Issues Paper. These are set out below.

Q1: What risks to safe vehicles that are currently out of scope for the HVNL should be brought into scope? What is in scope that shouldn’t be?

Regarding vehicle specifications, the BIC sees that there are minimal risks or restrictions in the HVNL that limit the uptake of safe buses and coaches.

There is a common misconception by regulators that the width of a bus or coaches’ body is somehow linked to the technology and safety that is available on a bus or coach. This is incorrect, the facts are that in Australia ADR compliant buses and coaches have traditionally been provided to market with the latest safety and emissions equipment that was available at their time of manufacture. This has partly been due to chassis and bus builders opting to promote safety within this *people moving market*, but also that the major purchases of buses are the large government and private fleets and these customers have always specified the highest safety and emissions standards.

Therefore, bus and coach safety features have often been introduced into the market a decade or more ahead of legislation (for example ABS was commonly fitted to buses from the early 1980's and Electronic Braking System (EBS) with disc brakes was available from around the year 2000).

In Appendix A of this paper, the BIC provides a copy of a presentation provided to the the Strategic Vehicle Safety and Environment Group (SVSEG) meeting on the 6th December 2018. The SVSEG's role is to advise the Australian Government on issues relating to the implementation and development of the Australian Design Rules for vehicles, and to consider regulatory and non-regulatory approaches to improving vehicle safety and environmental performance. As outlined in Appendix A, buses and coaches are already adopting world's best practice in terms of safety and technology systems. It should also be noted that this includes compliance to ADR 58/00 and 68/00 which both set some specific safety criterion that are higher than EU equivalents. Therefore, the BIC sees no need to alter the ADR set body widths for buses and coaches, but the BIC does accept that this may not be the case for trucks and trailers.

As such the BIC sees that buses and coaches need to be treated separately to trucks and this position is also supported at SVSEG by the release of the position paper *Other Critical Action L – Improving Safety (And Environmental Performance) While Minimising Regulatory Barriers (Including Overall Width),* which is solely limited to NC category vehicles.

However, the BIC does see that there are operating risks within the HVNL, with the main issue being the practice of using the now much outdated 65 kg per person average mass when determining a buses seating and standing capacity.

Q2: Have we covered the issues relating to safe vehicles accurately and comprehensively? If not, what do we need to know?

As stated in response to question 1, the BIC, supported by the specifications of thousands of buses and coaches that are operating on Australian roads, sees that the ADR width limit does not inhibit the uptake of advanced safety systems in the bus and coach sector.

However, the BIC sees that there are major regulation inconsistencies for bus and coach standards across states and that these inconsistencies are affecting safety. For example, there are fundamental differences between states in terms of allowable rear overhang, mass limits and standards for critical safety systems such as passenger door safety, rollaway protection, fire mitigation and school lights.

Q3: How can the future HVNL most effectively deliver safer vehicles to the road? Which aspects of the PBS scheme are working well, and which aren't? What barriers to the broad uptake of safer vehicles exist?

The current PBS standards do not promote nor provide a means to improve bus productivity. The main reason for this is that the PBS is truck based and not totally relevant to bus and coach operations nor does it reflect or assess real productivity improvements. For example, under the PBS a 2.55 m wide bus or coaches can, and have, been approved that offer less seating capacity then current equivalent ADR compliant buses. In contrast, higher productivity 14.5 m (2.5 m wide) buses that cannot meet the current truck-based PBS performance criterion, are being registered and operated successfully as controlled access buses in all States.

The BIC therefore sees that the PBS process needs to be tailored for buses and coaches specifically in the areas of:

- Buses typically perform very well in all aspects of the PBS criterion except;
    - Low speed swept path,
    - frontal swing and
    - tail swing.
- Some of the reasons for this are:
    - The need to comply with the Disability Discrimination Act (front door width to accommodate wheelchair ramps, hence long front overhangs),
    - Variations in Rear Overhang from State to State, QLD 4.7 metres or 70% wheelbase, NSW 4.9 metres or 70% wheelbase, VIC - 4.3 m or 60% wheelbase.
- The steerable tag 13.5 and 14.5 m buses are especially affected by tail swing, but these buses perform very well on the road.

Also, the PBS process needs to consider the real productivity gains of a PBS bus or coach. The sole intent of any bus or coach is to carry passengers, and productivity needs to be measured primarily in seated passenger capacity and for urban buses, standing capacity.

One issue where the HVNL is lacking and is currently generating a potential safety issue, is in relation to bus and coach loadings, specifically the use of the outdated average per passenger mass of 65 kg per person. The BIC sees that where buses and coaches are accessing higher mass limits (which have been developed in part to address the increasing average weight of passengers), the 65 kg per person ADR allowance should be replaced with 80 kg per person.

Refer to the BIC mass calculation process, as referred to by the NHVR on the *Information Sheet Mass Limits for Eligible 2-axle Buses under the Heavy Vehicle National Law,* that should be required at all registrations of new buses or coaches and any modifications and or retrofits.

http://www.ozebus.com.au/_literature_241705/BIC_2_Axle_Bus_80kg_Passenger_Calculation

Q4: How can the future HVNL encourage suitable maintenance programs? How can it most effectively identify and remove dangerous vehicles from the road?

The BIC sees that the States currently have in place workable and effective maintenance program requirements for buses and coaches and that such programs are over and above any general heavy vehicle type programs. These bus-specific programs have been developed and implemented over a long period of time and any changes in the HVNL that would seek to either replace or override these requirements should be done via consultation and industry input. Also, these programs are part of existing State-based operational contracts and as such any changes would have both financial and contractual implications for State governments and bus or coach operators.

The BIC general principle is to support standardised national regulation and if this includes maintenance programs within the HVNL, then the BIC would support such a proposal, but only if such changes were in line with existing best practice State-based programs and any such change was undertaken with industry consultation.

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The BIC would also wish to highlight that the existing National Heavy Vehicle Inspection Manual (NHVIM) is effective and it would appear that ongoing development and implementation of this document, along with industry developed advisories, would achieve part of the required outcome and still provide national standards for defects and general roadworthiness.

Therefore, the BIC certainly supports the notion that “A recast HVNL ought to support a cohesive national approach to vehicle inspections”.

Q5: How can the future HVNL meet the assurance needs of all Australian state and territory road transport authorities in a way that does not unreasonably impose on operators?

When the NHVR was initiated, a study was undertaken by the regulator, states and industry to collate all bus and coach-specific notices and/or gazettals with the view to ensuring that any newly developed national positions would set the existing Stare regulations as a minimum or benchmark. This same process needs to be undertaken in relation to any proposed changes to the HVNL.

Also, as much of the existing operational or in-service State based regulations for buses and coaches are part of a bus or coach operator’s accreditation and or contractual requirements, any changes to the HVNL need to both consider and not override these existing criteria.

Q6: Do we need assurances regarding repairs and replacement parts? If so, could these be achieved using standards? Should third-party repairers be explicitly included in the Chain of Responsibility? How can defect clearance processes be reasonably expedited?

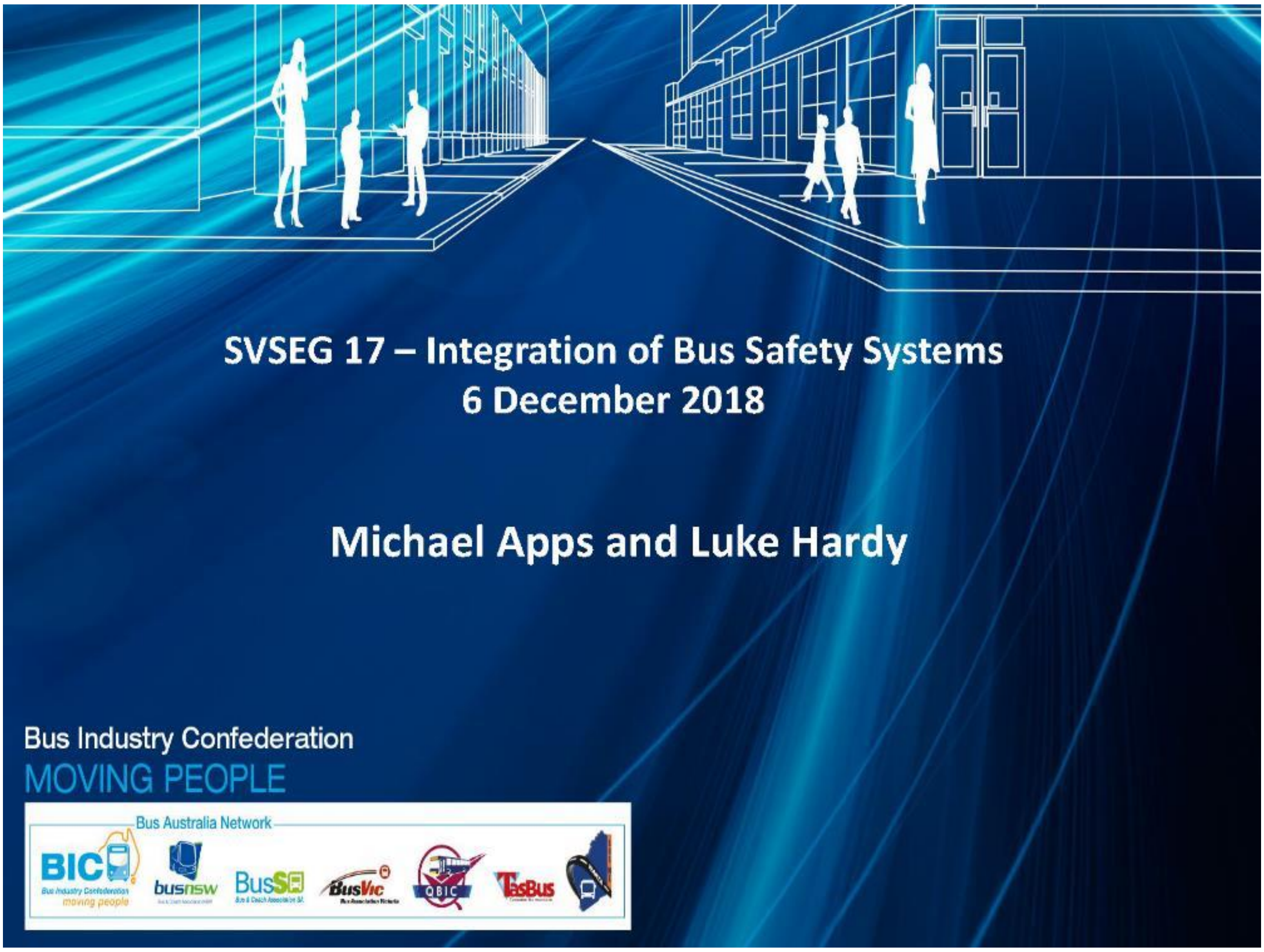
The State-based accreditation and or contractual requirements already set standards for supply chain and servicing criteria such that these need to meet or exceed OEM standards. The BIC sees no major issue with a process whereby approved third party repairers and/or spare parts providers are part of the chain of responsibilities (as OEMs are by default), but again any changes to the HVNL should recognise existing State-based regulations.

Q7: Should the future HVNL apply a risk-to-safety threshold for vehicle standards and loading matters?

The issue with applying a risk-to-safety threshold for vehicle standards for buses and coaches is that a risk might be considered as low due to either the frequency of an event or a low likelihood. However, as history has shown, one bus or coach crash can cause multiple casualties. Therefore, the BIC would need to see more information on how any such risk-based process was intended to operate before any comments or commitment could be made.

Further inquiries relating to this submission can be directed to Mr Michael Apps, Executive Director, Bus Industry Confederation on (02) 6547 5990.

Appendix A: Bus Safety and Technology Systems Status



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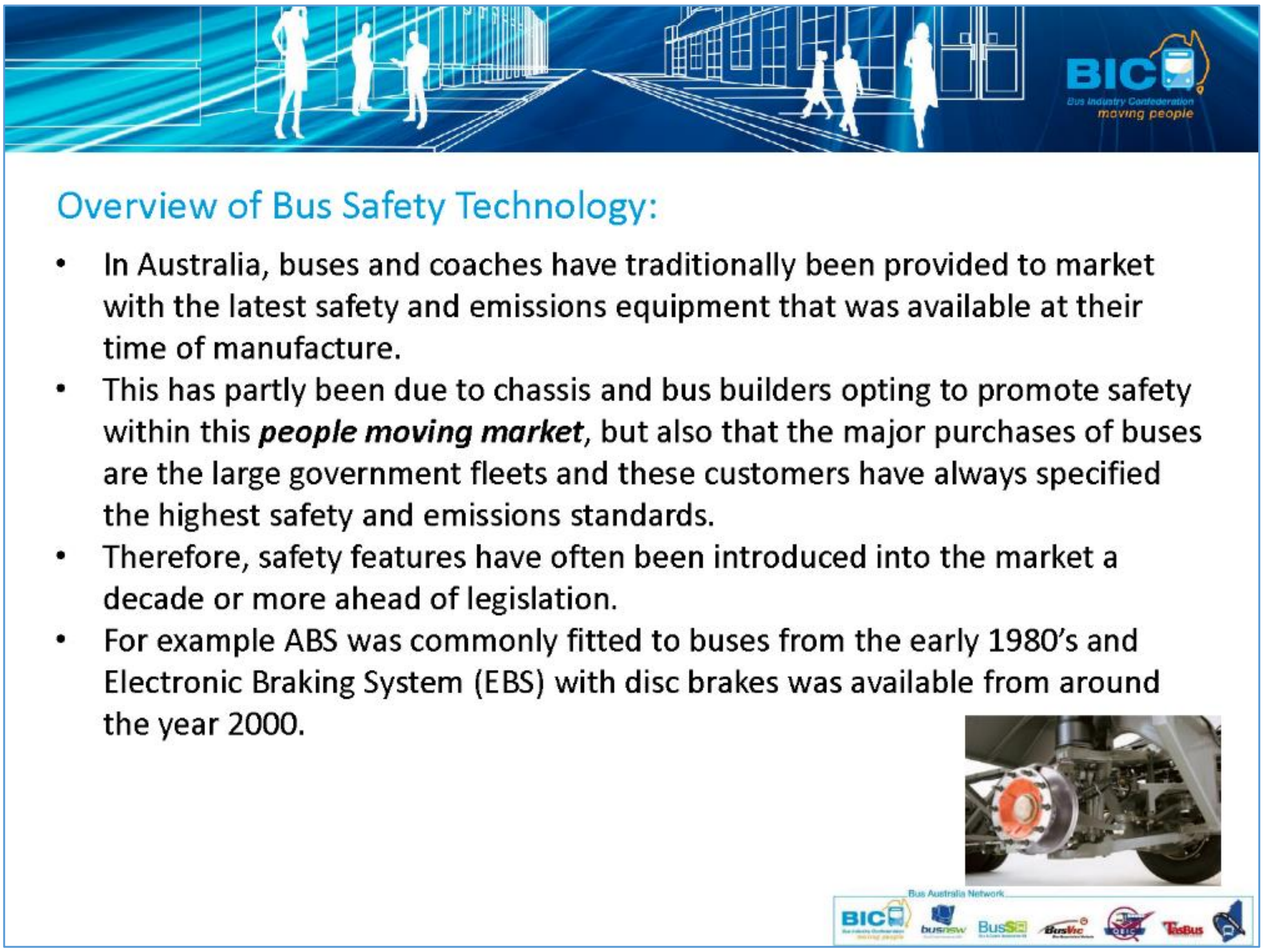

Overview of Bus Safety Technology:

- If one considers the latest innovations, plus the historically available systems, a coach in 2018 would typically have:
- Disk brakes, EBS, ESC and traction control along with;
  - *Forward Collision Warning (FCW)*
  - *Collision Warning and Emergency Brake (CWEB)*
  - *Lane Keeping Support (LKS)*
  - *Adaptive Cruise Control (ACC)*
  - *Dynamic Steering (VDS)*
  - *Enhanced roll over safety on coaches and intercity buses, and;*
  - *Driver Alert System (DAS) on coaches.*

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Current Examples of Bus Safety Technology:

- BHPB have recently awarded Greyhound a contract to supply more then 140 coaches for mining use.
- The buses are Irizar-Volvo coaches built in Brazil and they have the following safety specifications:

  - *Passenger seat belt monitoring system;*
  - *ABS / EBS and ESC / ECAS;*
  - *In-vehicle monitoring system / telematics;*
  - *Park brake alarm;*
  - *Driver duress system;*
  - *Fire-suppression system;*
  - *Driver fatigue-monitoring system;*
  - *Back-to-base tyre-pressure-monitoring system; and*
  - *CCTV with remote access.*

Current Examples of Bus Safety Technology:

- Crowther's Coaches with Mercedes-Benz OC 500 RF and Volgren Coach body, safety specifications:
  - *Euro 6.*
  - *Lane Departure Warning - SPA 'Lane Assist' system preparation provided on the chassis*
  - *Anti collision system - AEBS 'Advanced Emergency Braking System' provided on the chassis.*
  - *EBS 'Electronic Braking System'*
  - *ESP 'Electronic Stability Program'*
  - *ABS 'Antilock Braking System'*
  - *ASR 'Acceleration Skid Control'*

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Current Examples of Bus Safety Technology:

- Volvo for example offer the following features in their ***Driver Support System*** on any locally supplied coach:

  - *EBS 'Electronic Braking System'*
  - *ESP 'Electronic Stability Program'*
  - *ABS 'Antilock Braking System'*
  - *ASR 'Acceleration Skid Control'*
  - *Volvo also offer as an option DSS (see attached)*
  - *Lane Keeping System (departure warning)*
  - *Active Cruise Control (keeping a set time gap to the vehicle in front).*
  - *Collision warning System with Automatic Emergency Braking (AEBS).*
- Note: the above type packages are mandatory in the EU market.

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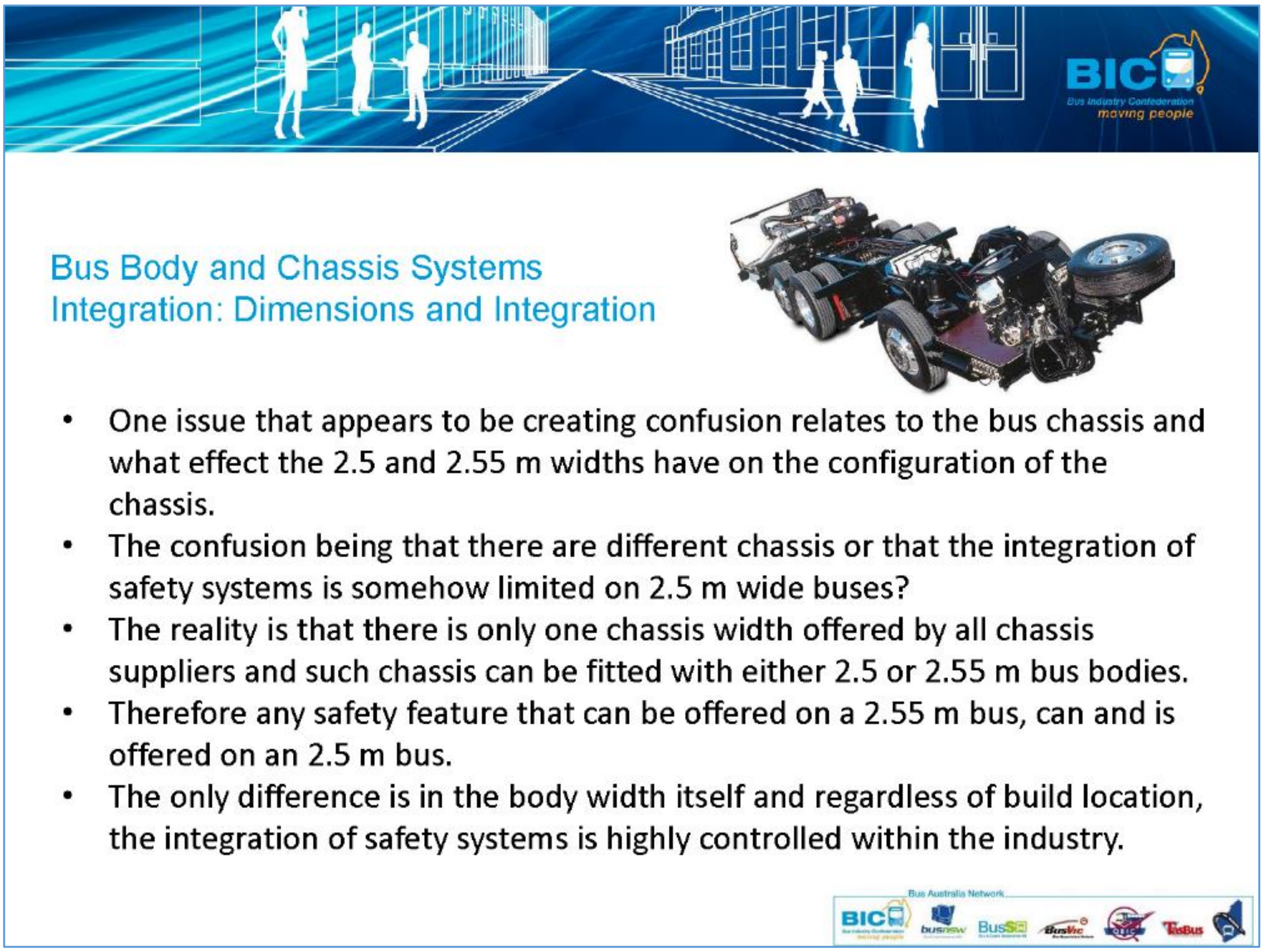

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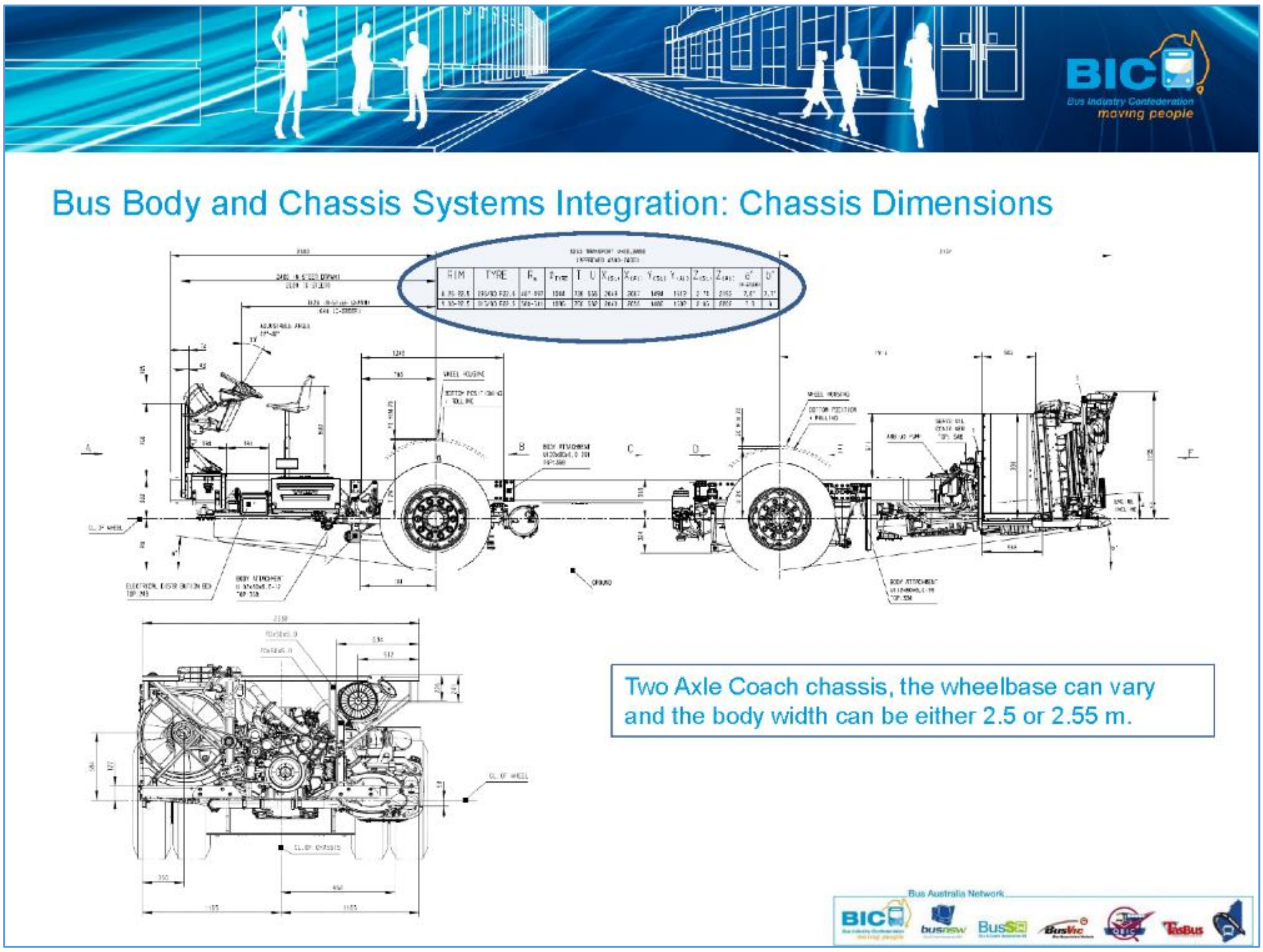

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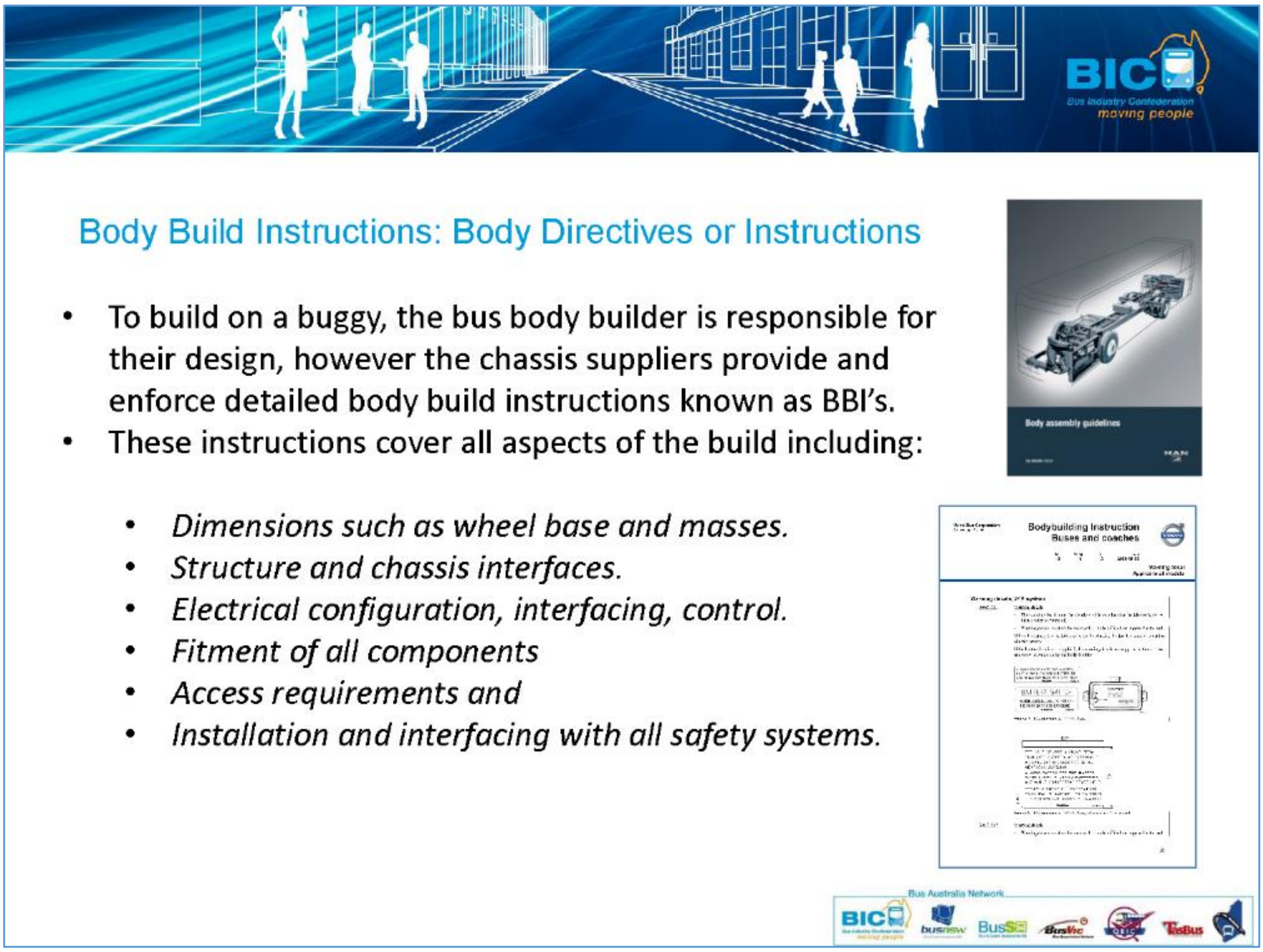

Bus and Coach Build Process: Chassis Extension BBI Compliance

- In buggy form, the chassis is bolted together on a transport wheelbase.
- The body builder extends the chassis and installs the chassis extension in accordance with the chassis supplier instructions.

Low Coach Chassis with transport framing.

Chassis extension laser cut and jig made stainless steel.

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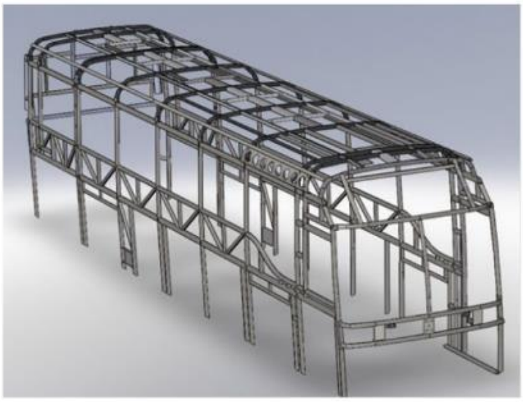
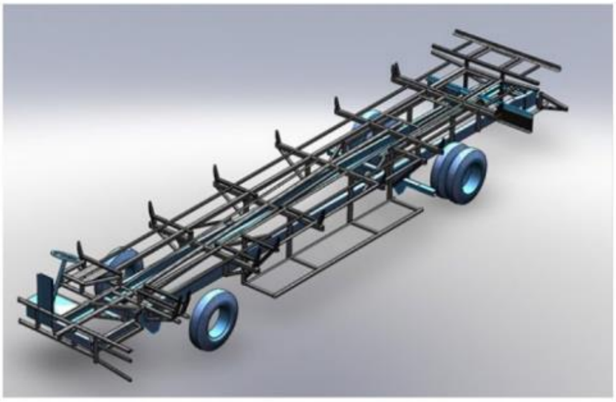
Bus and Coach Build Process: Body Structure

- The bus body frame consists of; Roof, Side, Front and Rear Frames that are assembled into a cage.
- The chassis, in this case a coach type, is fitted with a welded stainless steel frame with chassis extension and associated floor structure.
- All connections and interfaces with the chassis are dictated by the chassis supplier.





Bus and Coach Build Process: Structure

- Bus frames are welded or bolted, Volgren use a bolted aluminium framing system, others are typically welded stainless steel.
- There are variations to the chassis/body configuration, Bustech for example offer their own chassis which consists of sub-supplier provided drivetrain, axles, steering with integration by Bustech.

Local and imported Double Decker buses.

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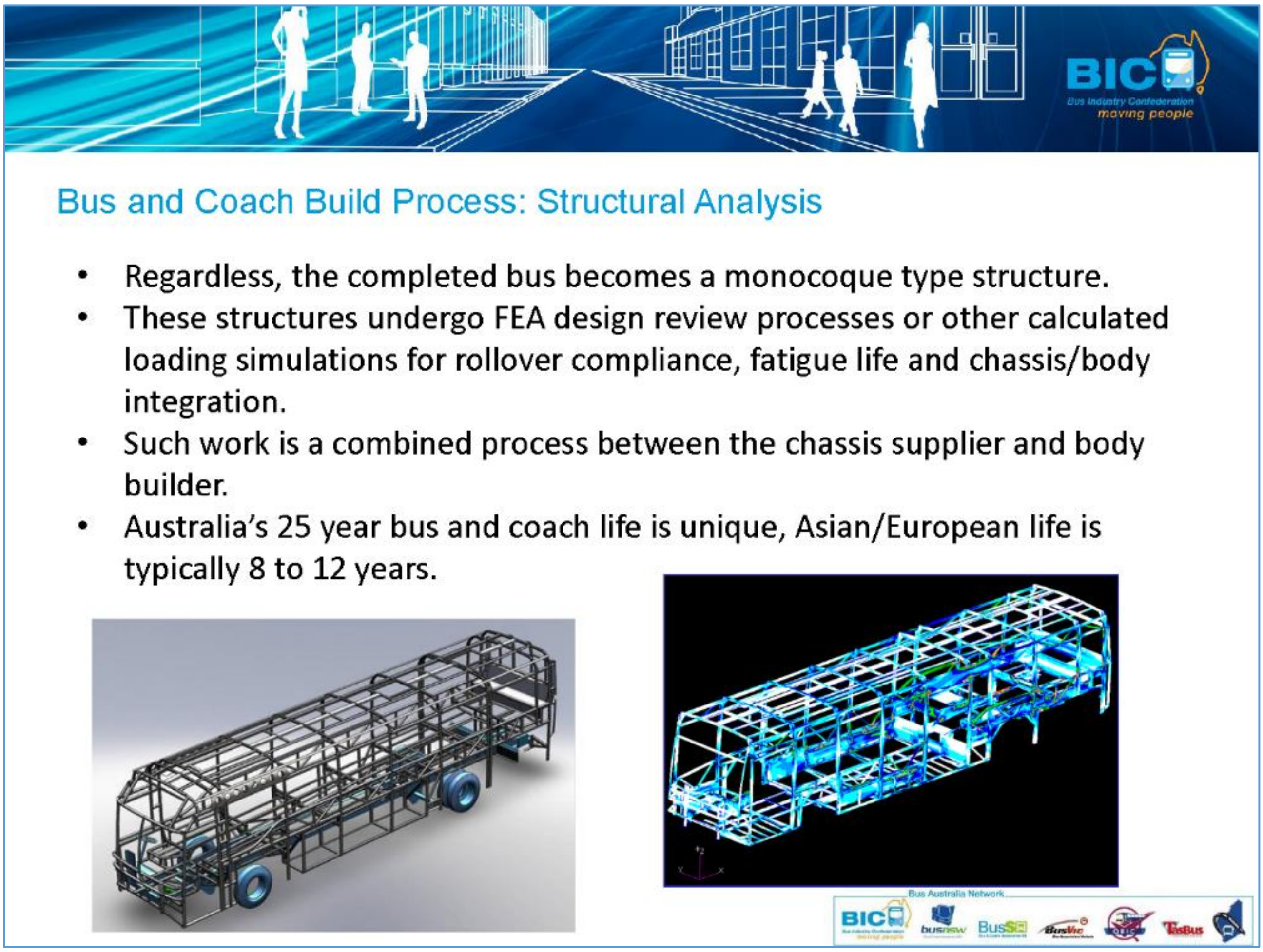
Bus and Coach Build Process: Structural Analysis
• Regardless, the completed bus becomes a monocoque type structure.
• These structures undergo FEA design review processes or other calculated loading simulations for rollover compliance, fatigue life and chassis/body integration.
• Such work is a combined process between the chassis supplier and body builder.
• Australia's 25 year bus and coach life is unique, Asian/European life is typically 8 to 12 years.
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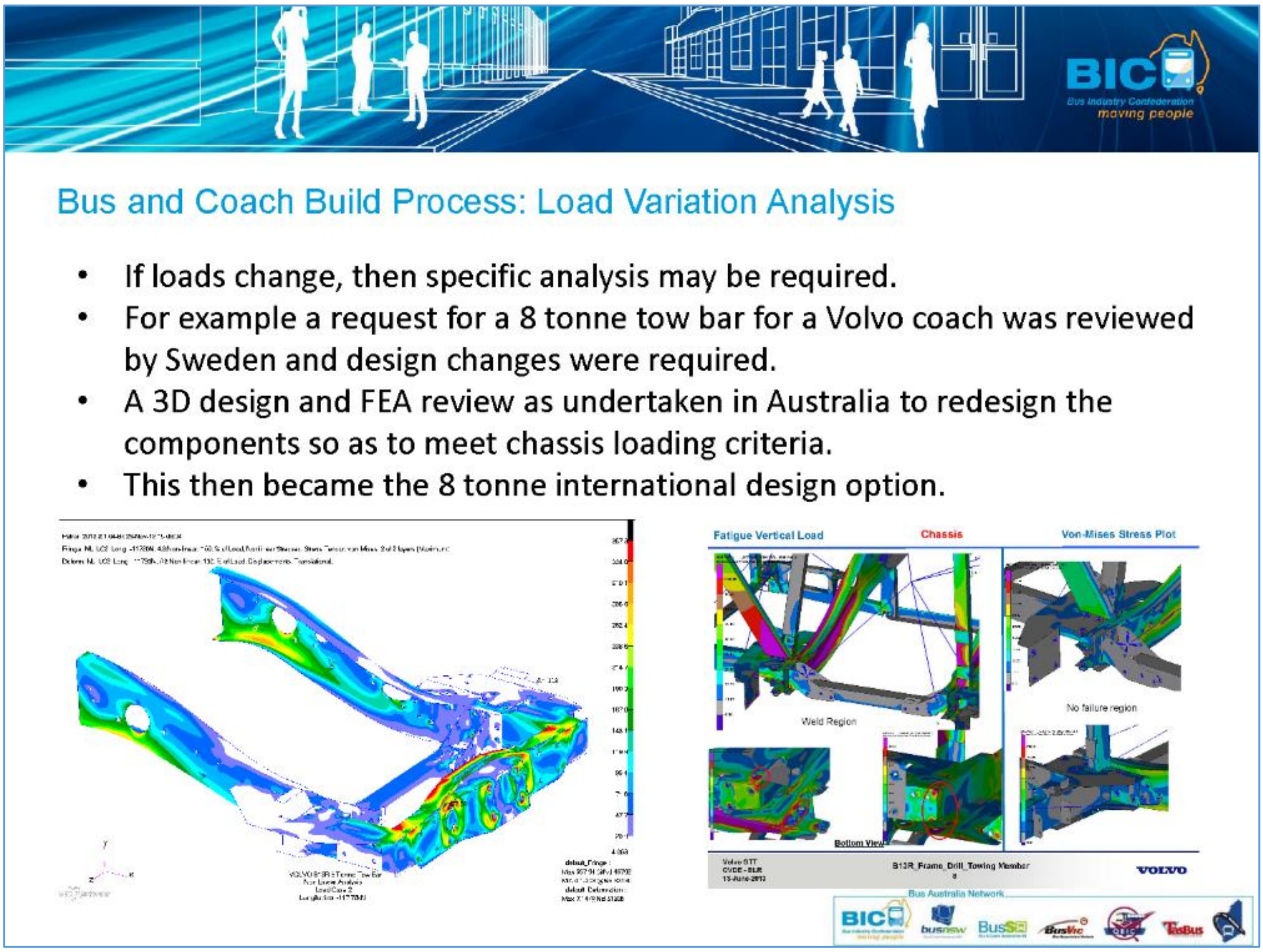


Bus Body Integration Instructions: Electrical Integration.

- The chassis supplier provides detailed instructions in relation to electrical systems.
- Modern chassis and bus bodies run multiplexing electrical systems.
- The chassis supplier requires that the body builder interfaces with the chassis system specific connection points.
- These are Controller Area Network (CAN bus) type connections designed to allow microcontrollers and devices to communicate with each other in applications without a host computer. It is a message-based protocol, designed originally for multiplex electrical wiring within automobiles.

Body builder connectors

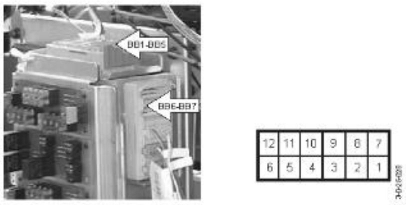
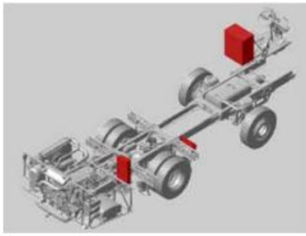
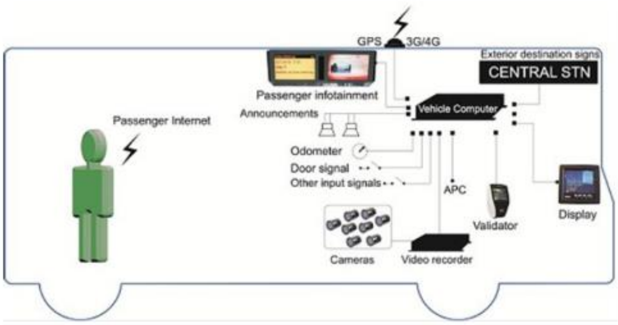


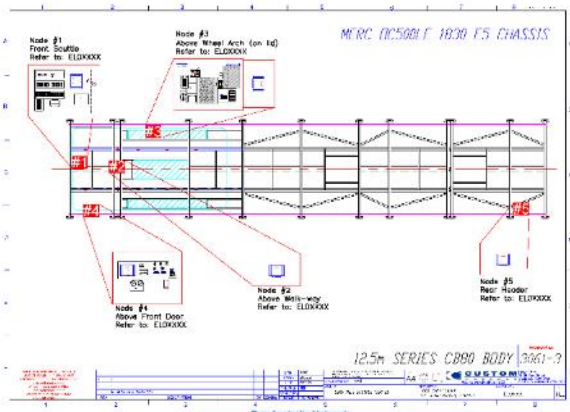
Figure 9 Body builder connectors



Bus Body Integration Instructions: Electrical Integration.

- The body electrical system will typically control the body functions such as lighting, door systems, air-conditioning, passenger information systems etc, via multiplex nodes and a central computer.
- The multiplex standard in Australia is currently Thoreb with a range of added equipment.





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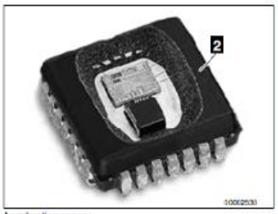
Bus Body Integration Instructions: Electrical Integration Safety Systems.

- The chassis supplier will also specify the installation and location of key safety items such as Yaw Sensors and Accelerometers.
- Such components are used for functions such as ESC and anti-dive braking.
- If for example a coach is to be fitted with lane departure warning, the chassis supplier will set the criteria for the supplied camera location and calibration.

Acceleration sensor

The lateral acceleration sensor 2 measures the lateral acceleration (i.e. drifting) of the vehicle.

The illustration shows an example.



Acceleration sensor

Item	Designation
2	Lateral acceleration sensor

For further information on retrofitting the indicator and warning lamps:

See the chapter **Instrument cluster symbol panel** (☞ page 65)

Yaw rate sensor

The yaw rate sensor is also referred to as the rotational speed sensor 1 and detects the yawing moment when the vehicle breaks away (skids).

Yawing moment = Rotation of the vehicle about its vertical axis. The information as to whether and how the vehicle is rotating about its vertical axis is acquired by a yaw rate sensor ("yaw" is the technical term for the rotational movement of an object about its vertical axis). The yaw rate sensor or rotational speed sensor 1 is located at the vehicle's centre of gravity, for example attached to a frame cross member at the middle of the vehicle.

Yaw rate sensor

Item	Designation
1	Yaw rate sensor or rotational speed sensor

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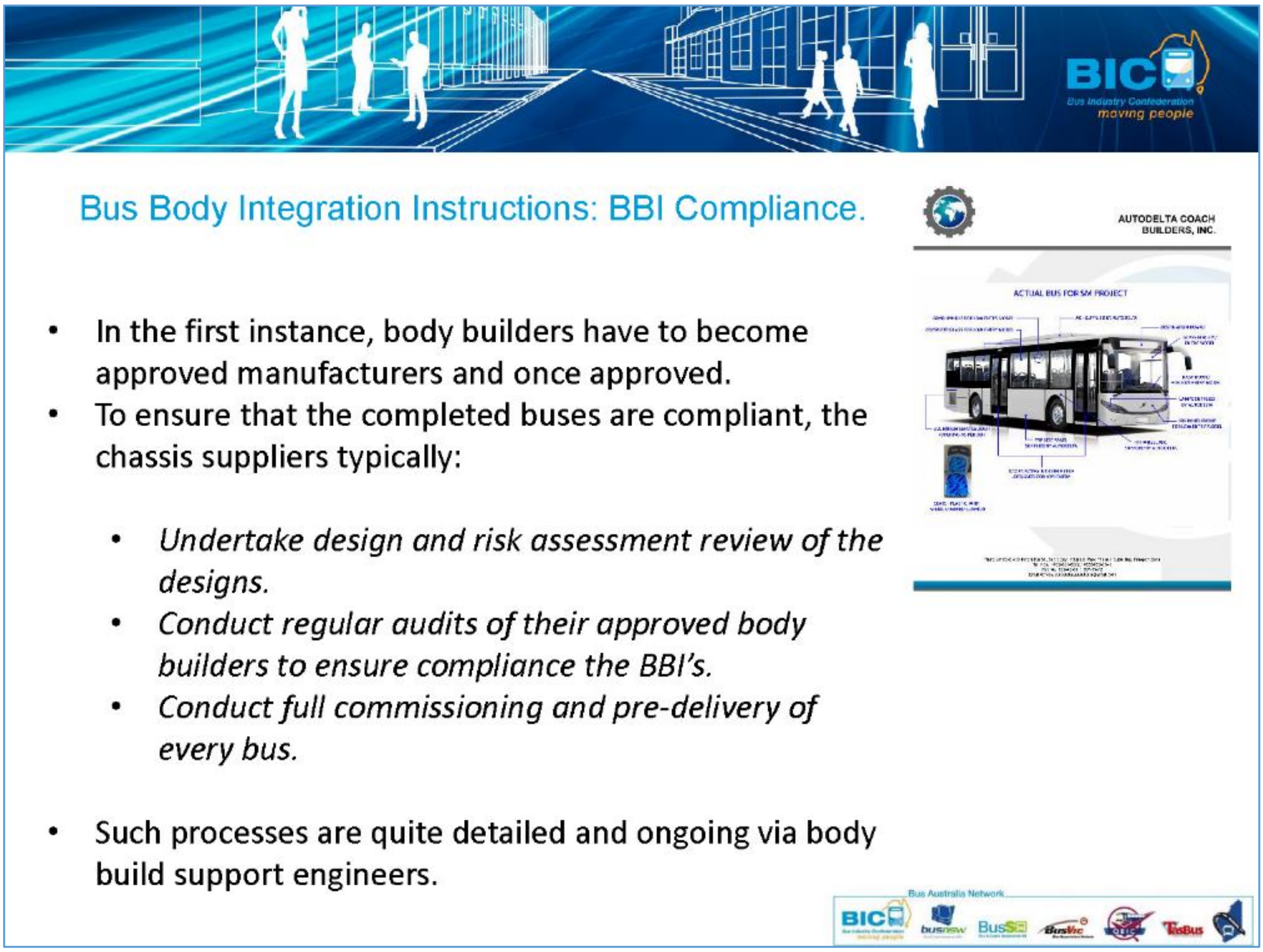

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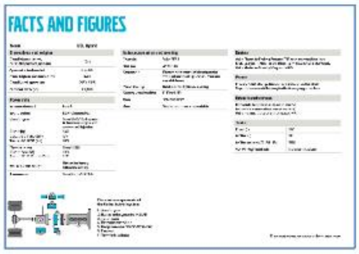
Conclusions

- For full sized buses and coaches, the chassis length varies, but the chassis width does not.
- The body builder sets either a 2.5 or 2.55 m on the chassis.
- The integration of chassis and body, including all safety features, is closely controlled by the respective chassis suppliers regardless of where the bus or coach is manufactured (either fully imported, or locally manufactured).
- Finally, the Australian bus and coach market is continuing to provide advanced safety systems well ahead of legislation.



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