PUBLIC TRANSPORT VICTORIA

Court ref: COR 2017 004263
CM ref: DOC/19/275536

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Coroner Simon McGregor
State Coroner
Coroners Court of Victoria
65 Kavanagh Street
SOUTHBANK, VIC, 3006

Dear Coroner McGregor

INVESTIGATION INTO THE DEATH OF JOHN WILKS

We refer to your finding, without an inquest, concerning the tragic death of Mr John Wilks.

PTV is the statutory authority responsible for managing the Melbourne metropolitan bus network on behalf of the State of Victoria. PTV is committed to delivering improvements to keep people moving on a reliable, safe and inclusive public transport network.

Public Transport Victoria (**PTV**), Bus Association Victoria (**BAV**), Department of Transport (**DoT**), Transport Safety Victoria (**TSV)** and the Office for Disability (**OfD**) have formed a Governance Committee to oversee the review, response and implementation of all recommendations included in your finding. In addition to the PTV bus contract management area, members of the Inclusive Public Transport area are also represented on the Governance Committee.

Members of the Governance Committee have also engaged key stakeholders from the Victorian Equal Opportunity and Human Rights Commission, the Victorian Disability Advisory Council and the Public Transport Access Committee to keep each organisation informed of the Governance Committee's process and approach to addressing the recommendations.

The Governance Committee's joint response and PTV's individual responses to your recommendations are detailed below.

Recommendation 1

Public Transport Victoria, Bus Association Victoria and the Office for Disability form a working group to consider and recommend how the Bus Safety Act 2009 can be amended to require the mandatory installation of appropriate wheelchair restraints on Victorian public buses to prevent falls among wheelchair users, and to specify what form these restraints should take.

As mentioned above a Governance Committee has been formed and are considering amendments to the *Bus Safety Act 2009* in accordance with recommendation 1.

Research into the *Bus Safety Act 2009 (***BSA***) and Bus Safety Regulations 2010 (***BSR***)* by the Governance Committee has shown them as being an unlikely suitable means for implementing mandatory safety recommendations.

The BSA and BSR were developed with the intention of establishing a best practice regulatory framework for the management of safety aspects of bus operations in Victoria. It seeks to avoid

imposing prescriptive requirements for the management of safety risks of bus operations, and instead provides a framework within which risks to bus safety can be managed and reduced so far as is reasonably practicable. It imposes safety duty responsibilities on all participants who are in a position to influence the safety of the bus operation, with the degree of responsibility dependant on the extent to which a person can control, eliminate or mitigate that risk.

The BSA and BSR require that operators have appropriate systems in place to manage the safety risks of their operation, as they identify those risks. It does not mandate what solutions to specific issues should look like, but rather holds the accredited or registered operator responsible for development of the solution, within the framework of the systems required (which include, among other things, a Management Maintenance System for accredited operators, a Management Information System for accredited operators, and appropriate systems to manage safety of drivers (fatigue, drug and alcohol policy etc). Schedule 1 of the BSR provides some limited specific requirements for particular aspects of bus design and operation, but these are very limited.

For the above reasons, if a decision were made to mandate a specific solution to address the safety of users of mobility devices on buses, such specificity would not be well aligned to the policy basis of the BSA and BSR.

The Governance Committee is currently investigating alternate means of addressing the recommendation by engaging Central Queensland University (**CQU**) to undertake research regarding national and international practices regarding wheelchair tiedown and occupant restraint systems (**WTORS**) for mobility devices on public route buses.

PTV have committed funding for CQU to undertake and provide findings from the research which will also include recommendations to address safety of mobility device users on buses. This is expected to be completed in September 2019.

Phase 2 of the research under consideration by the Governance Committee will investigate where WTORS are not used what evidence exists for not implementing a restraint system and to understand what systems or processes are in place to ensure the safety of passengers travelling without WTORS. The findings from Phase 1 will determine the need to undertake Phase 2.

The Governance Committee have attached a copy of the research proposal from CQU for your reference.

In addition to the research engagement with CQU noted above the Governance Committee are in the process of seeking feedback and evidence from current public bus service operators, including Ventura, on any restraint systems trialled or implemented on buses. This will also include feedback from Transdev who recently conducted a consultation session regarding new bus designs with members of the accessibility community. The Governance Committee are seeking information on any risk and safety assessments conducted and lessons learned from any restraints systems trialled.

On completion of assessment of the research and evidence, the Governance Committee will engage with mobility users on the bus network to consult on the findings and potential options to ensure safe travel on public buses for passengers in mobility devices. This consultation will inform the way forward in relation to any specific solution and the mechanism to implement, should a specific solution be determined. The Governance Committee is aiming to provide potential options for solutions to Government by the end of 2019.

Recommendation 2

The Minister for Public Transport engage with route bus operators to encourage adopting Ventura Bus Lines' policy of mandating the 'ironing board device' and tether belt in their specifications for all new public buses.

As noted above in relation to recommendation 1, the Governance Committee is undertaking a systematic review of options available including identifying good practice for the safe travel of passengers on public buses in mobility devices. This will also include determining the most appropriate mechanism for any proposed solution.

Additionally, PTV are in discussions with Ventura regarding the solutions they have implemented. This includes understanding their process to determine the current solutions, the stakeholders involved, the risk and safety assessments conducted and the feedback they have received to-date on the solutions implemented.

Therefore, the Governance Committee does not recommend mandating bus operators to implement the 'ironing board device' and tether belt in their specifications for all new public buses at this time. Following the completion and analysis of the research and evidence being sought under recommendation 1, a robust risk and change management process will be adopted for any solution so that there are no unintended consequences.

Recommendation 3

The Minister for Public Transport engage with route bus operators to review procedures for reporting injuries which occur on public buses.

PTV, TSV and BAV have presented a consolidated approach to the Governance Committee in order to engage with bus operators in relation to reviewing and improving procedures for reporting injuries which occur on public buses.

This will include TSV including in their regular communications, reminders and updates of bus operators' incident reporting obligations, BAV and TSV are working together to review improved procedures and practices for incident reporting and PTV will be formally writing to contract bus operators to reinforce contractual obligations to comply with TSV's incident reporting obligations.

In addition to the actions noted above, PTV, BAV, TSV, DoT and Victoria Police have a meeting scheduled in July 2019 to discuss the strategic and operational requirements regarding incident reporting to inform further improvements in clarifying which incidents are reported, the manner of collection and the level of information provided as part of the incident reporting process.

Recommendation 4

No later than 18 months from the date of this decision, the Public Transport Victoria, Transport Safety Victoria and the Minister for Public Transport request the Victorian Equal Opportunity and Human Rights Commission to conduct a review under section 41(c) of the Charter of any improvements to programmes and practices made in response to recommendations 1 to 3 in this decision.

Following the completion of actions in relation to recommendations 1, 2 and 3, PTV, Transport Safety Victoria and the Minister for Public Transport will consider requesting the Victorian Equal Opportunity and Human Rights Commission to conduct the review.

Recommendation 5

Once the review in Recommendation 4 is completed, each Public Authority should develop a plan to apply the Review's findings and recommendations to all bus transport systems within their remit within an additional three months.

Following the completion of actions in relation to recommendation 4, PTV will consider researching and developing a plan to apply the Review's findings and recommendations to all bus transport systems within their remit within an additional three months.

Thank you for providing us with the opportunity to respond to your recommendations.

PTV will be happy to update the Coroner as the abovementioned actions progress.

Yours sincerely

JEROEN WEIMAR
Chief Executive Officer
Public Transport Victoria
26 / 06 / 2019

PROJECT TITLE

Wheelchair tiedown and occupant restraint systems (WTORS) for mobility devices on public route buses: Phase 1 – National and international literature audit and survey

PROJECT SUMMARY

This investigation will be conducted in two sequential phases. This Contract details Phase 1 and provides an overview of activities that could be conducted in Phase 2. Regular discussions with the Governance Committee will occur across Phase 1 to inform development of Phase 2.

Throughout this document, wheelchair and mobility scooter are collectively referred to as mobility devices. Furthermore, restraint or tie down systems for both wheelchairs and scooters are referred to as wheelchair tiedown and occupant restraint systems (WTORS).

The research will provide recommendations based on investigations of the following questions and sub questions:

Phase 1 (Desktop Audit and Electronic Survey)

1. What data are available in the public domain both nationally and internationally with regards to incidents and injuries relating to both: (a) movement / slippage of mobility devices outside the allocated space; and (b) falls or mobility devices tipping over.
2. What are current national and international practices regarding WTORS for mobility devices on public buses, including the associated time requirement for use and costs, and have the use of restraints reduced death / serious injury.
3. What passenger feedback data exists on the use / non-use of WTORS on public buses?
    a. What do typical Australian bus users and typical mobility device users (where restraints are not in routine use) think about safe transit, and transit timeframes (and noting local conditions and operating environments), if WTORS are used / or are not used?
    b. What do typical American bus users and typical mobility device users (where restraints are required to be used) think about safe transit, and transit timeframes (and noting local conditions and operating environments), if WTORS are used / or are not used?

Phase 2 (Bus Operators / WTORS Systems Study)

4. In Australian states, and countries other than Australia where WTORS are not used, have operators considered the implementation of a restraint system? If so, what was the evidence for not implementing a restraint system, and what systems or processes are in place to ensure the safety of their passengers?
5. Based on findings from Phase 1, if a restraint system is identified that the Governance Committee is interested in testing in the Victorian context, small-scale engineering experiments will be undertaken to answer questions such as: how effective is the restraint to overcome lateral and fore-aft G forces for sideways slippage and tipping over; how much time does it take to put the restraint in operation; and, is the restraint suitable for retro-fitting in current rolling stock?

DELIVERABLES

The outcomes of the research will be documented in a succinct report delivered in draft form 9 weeks following project commencement. The report will summarise all findings and provide a series of recommendations in relation to:

(i) current bus WTORS practices in Victoria, and

(ii) further work to be undertaken in Phase 2.

Given the input from the Governance Committee across the project (as noted below), it is anticipated that the Committee will be appraised regularly of findings across the project, and that this report together with input from the Governance Committee will inform the implementation of Phase 2 of the research.

SCHOLARLY REPORTING OF FINDINGS

1. Potential for industry or academic conference presentations. This will only be undertaken with approval from PTV with comment and review from PTV (and with PTV named or anonymous as preferred).
2. Potential for publication of audit and survey data in a peer-reviewed transport journal such as 'Transport Policy', with comment and review from PTV (and with PTV named or anonymous as preferred).

PROJECT DESCRIPTION

Public transport aims to provide an affordable and efficient 'whole journey' for all customers. Bus travel is widely recognised as one of the most accessible forms of public transport given flexible route access across local communities, and the wide-spread use of low-floor format. For these reasons among others, people using manual and powered wheelchairs and mobility scooters routinely use bus travel, and the number of users is rising, particularly as the population ages and increasing numbers of older people use mobility scooters to continue to access the community independently (Lenker et al., 2016; Hwangbo et al., 2015). Throughout this document, wheelchair and mobility scooters are collectively referred to as mobility devices. Furthermore, restraint or tie down systems for both wheelchairs and scooters are referred to as wheelchair tiedown and occupant restraint systems (WTORS).

Ensuring the safety of all bus users whilst in transit is of paramount importance to bus operators and regulators. This includes safety not only in a crash, but also during normal transit when a bus driver may need to brake harshly, take a sharp corner, or invoke other evasive action to avoid collision. All these instances require passengers to stabilize themselves, which can be more difficult for wheelchair and scooter occupants. Ambulant passengers are seated on benches or seating that is bolted to the floor, have access to handrails to hold onto, and not use seat-belt style restraints. Passengers using mobility devices on public route buses in Victoria do not have their devices secured to the floor, and they may or may not be using a seatbelt to assist with remaining in the chair. This means the mobility device may slide outside the designated position, or tip over. Injuries to the mobility device user as well as other passengers may result from these events. A wide range of four-point, strap-type WTORS exist and can be used in public route buses(referred to as transit buses internationally) (Frost et al., 2013), paratransit specialist disability transport buses (Frost, Bertocci & Smalley, 2018) and taxis (Cooney, Walsh & Gannon, 2007). Throughout this proposal, these are referred to as WTORS and full descriptions of each type of system will be provided in the first phase of this research. However, the use of these devices is not without concern and controversy as; their value in reducing serious injury or death is not known, there are potential problems (e.g. trip hazard) for other passengers due to strapping and tie down systems on the floor space, the costs associated with prospective or retrofitting systems, and any requirements for a bus driver to leave their seat and secure a mobility device slows service delivery times.

In the USA where WTORS are widely used, although *not mandated* under the American with Disabilities Act (ADA, 1990), individual bus operators are able to develop their own policies. As a result, only around a quarter of operators have been found to mandate their use (Buning et al., 2007) and a more recent study has demonstrated that even when tiedown systems are used, they are frequently misused (Frost et al., 2013). See Figures 1 and 2. This adds to the dilemma over desirability of installation, since WTORS only have the potential to reduce injury or death if used correctly.

Figure 1. Correct tie down, shown in aerial view (Frost et al., 2013)

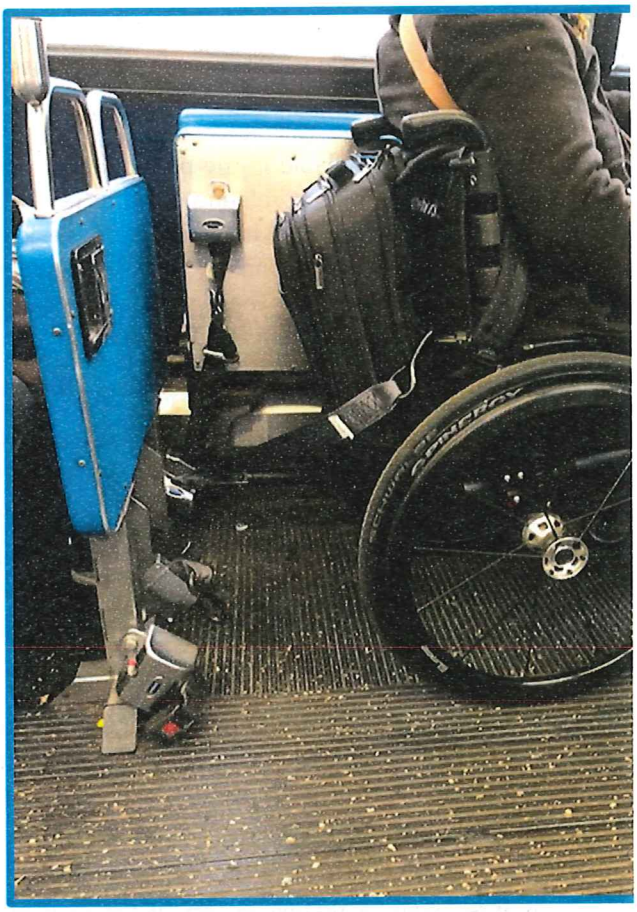


Figure 2. Incorrect tiedown in use, photographed by the researchers in USA, 2018.

A final consideration in relation to the installation of WTORS is how passengers view and respond to their presence and use. The beliefs and attitudes of both mobility device users and general bus users should also be considered. The complexity of many of the issues mentioned above (safety, correct use, cost, transit times) must also be weighed against all bus passengers' expectations of a journey that is 'typical' rather than segregated or stigmatized because of disability and the use of a mobility device that needs to be manually secured. While there are some general studies examining accessible transport for people with disabilities (Pyer et al., 2014; May, Garrett & Ballantyne, 2010; Westrand et al, 2008), there is very little research that specifically seeks to understand how both mobility aid users and the public weigh variables such as safety, correct use, cost, transit times, and appearance of using a restraint to determine if they would support their use or introduction. This information can be useful to guide future recommendations on use of WTORS.

This research will be conducted in two Phases, with Phase 1 detailed and fully-costed in this proposal. An outline of Phase 2 is provided but limited details are given as the questions and methodology may change in response to findings, and discussions with the Committee following Phase 1.

Research Questions

A series of research questions will be addressed across the two phases, summarized as follows:

Phase 1 (Desktop Audit and Electronic Survey):

1. What data is available in the public domain both nationally and internationally with regards to incidents and injuries relating to both: (a) movement / slippage of mobility devices outside the allocated space; and (b) falls or mobility devices tipping over.
2. What are current national and international practices regarding WTORS for mobility devices on public buses, including the associated time requirement for use and costs, and have the use of restraints reduced death / serious injury.
3. What passenger feedback data exists on the use/ non-use of WTORS on public buses?
    a. What do typical Australian bus users and typical mobility device users (where restraints are not in routine use) think about safe transit, and transit timeframes (and noting local conditions and operating environments), if WTORS are used / or are not used?
    b. What do typical American bus users and typical mobility device users (where restraints are required to be used) think about safe transit, and transit timeframes (and noting local conditions and operating environments), if WTORS are used / or are not used?

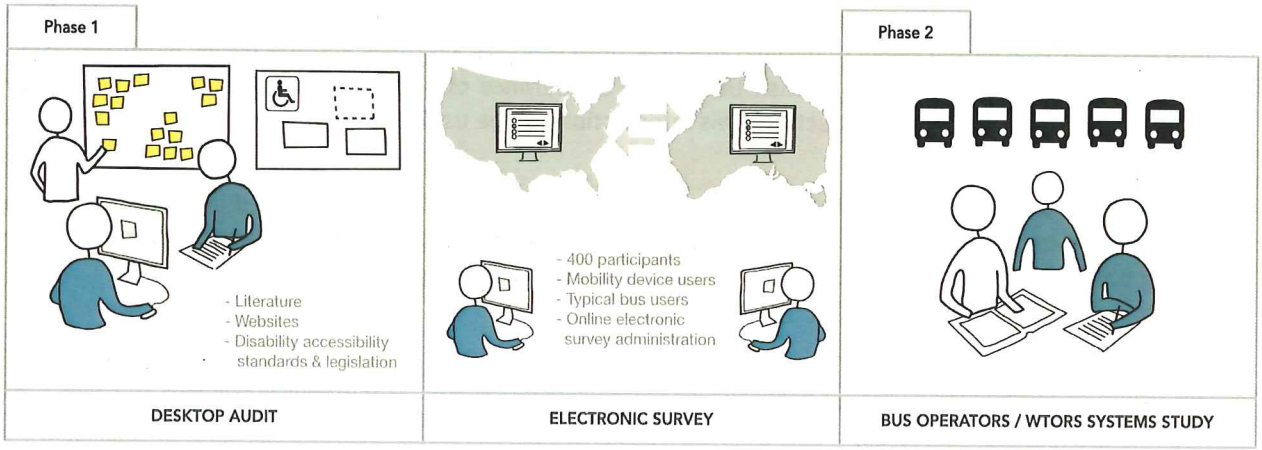
Phase 2 (Bus Operators / WTORS Systems Study):

4. In Australian states, and countries other than Australia where WTORS are not used, have operators considered the implementation of a restraint system? If so, what was the evidence for not implementing a restraint system, and what systems or processes are in place to ensure the safety of their passengers?
5. Based on findings from Phase 1, if a restraint system is identified that the Governance Committee is interested in testing in the Victorian context, small-scale engineering experiments will be undertaken to answer questions such as: how effective is the restraint to overcome lateral and fore-aft G forces for sideways slippage and tipping over, how much time does it take to put the restraint in operation, and is the restraint suitable for retro-fitting in current rolling stock.

Approach and Methodology

Research Design

This research is mixed methods (including quantitative and qualitative elements) and has two Phases, with Phase 1 answering questions 1, 2 and 3, and Phase 2 answering question 4 and 5 as shown below. An Action Research approach is also adopted with the Governance Committee involved in directing Phase 2 as Phase 1 findings are known.



Phase 1 Method:

To answer questions 1 and 2, a desk-top audit will be conducted of all materials (e.g. written and video materials) available in English within the public domain including websites, disability accessibility standards and legislation, and peer reviewed and non-peer reviewed literature. Based on a preliminary scan of literature / websites / and regulatory documentation we propose to review materials available in English language from the 10 countries presented in Table 1:

Table 1. Prospective* countries for inclusion in the review

1. Australia - all states and territories	6. Netherlands
1. Brazil	7. New Zealand
2. Canada	8. Sweden
3. Japan	9. United Kingdom (England)
4. Korea	10. United States of America

**Selected countries may change after initial review. There is some evidence that differences exist within countries, and therefore, it may be possible to obtain data from a small number of cities or provinces (for example, anecdotal reports suggest differences in WTORS requirements across Toronto, Vancouver and Montreal in Canada).*

Data collection and analysis

The data extracted through the audit process will be tabulated in an Excel file, to enable easy identification of current practices, costs, and salient information. Preparing this material in Table form will also enable easy identification of where information was unable to be sourced through desktop review, and therefore where research efforts may need to be directed in Phase 2.

Simple descriptive techniques will be used to tabulate and summarise information found and use this to formulate recommendations. Table 2 (over page) depicts the data collection template.

Table 2: Format for data collection, of materials available in English within the public domain

	Relevant standards and legislation	Data on (i) number of incidents, (ii) number of injuries or deaths resulting from (a) movement/slip page outside the allocated space and (b) falls or mobility devices tipping over.	What mobility device WTORS are used if any?	Do WTORS cater for all mobility device?	Evidence if the use of WTORS has reduced deaths, or serious injuries, for users.	Who is responsible for ensuring the mobility device has been correctly restrained or tied down?	Any unintended consequences from using the WTORS? E.g. system causing problems for other passengers?	Evidence of the use of WTORS reducing bus service delivery timeframe.	Have WTORS been retro fitted to existing fleets or installed in new buses brought into service? If retro fitted how was structural integrity ensured?	Costs associated with installing/ using WTORS.	Passenger feedback (both from typical passengers and passengers using mobility devices)
Australia NSW											
Australia ACT											
Australia QLD											
Australia NT											
Australia WA											
Australia SA											
Australia TAS											
Brazil											
Canada											
Japan											
Korea											
Netherlands											
New Zealand											
Sweden											
UK (England)											
USA											

To answer question 3, regarding passenger feedback on the use / non-use of WTORS on public buses, we will use two approaches. As part of the desktop audit, we will scan websites and literature for information on passenger feedback available in each of the 10 countries in the review. In addition, we will conduct an electronic survey of the opinions of 400 Australian and American mobility device users and general members of the public who uses buses, regarding the use of WTORS on public route buses.

Data collection

1. Review of websites and literature.
2. Survey of public opinion. Prospective data collection with a total of 400 participants who will be recruited through an online recruitment and survey administration platform as follows:
   - 100 Australian typical bus users
   - 100 Australian mobility device users
   - 100 American typical bus users
   - 100 American mobility device users

The 400 participants will be asked a short number of questions, with Likert-type scales all designed to be completed in under 10 minutes such as:

1. Demographics
   1.1. All participants: age, sex, purpose of bus travel, frequency of bus travel, length of typical journeys, frequency of other people using mobility devices on the bus.
   1.2. Participants using a mobility device: same as above and type of disability, type of mobility device used, length of time used for, if WTORS are used, what type, who does the tie down, how long it takes, how secure it is.
2. Views on the safety effectiveness of WTORS, and whether they reduce serious injury or death (Likert scale, and short answer)
3. Views on the time efficiency of WTORS (Likert scale, and short answer)
4. Views on any problems with WTORS when they are not in use (Likert scale, and short answer)
5. Rank order (Social Judgment Theory) task where respondents weight the importance of variables when considering whether people using mobility devices should use WTORS as compulsory or optional (eg. Safety, comfort, cost, transit time, appearance of disability)
6. General views on whether people using mobility devices should use WTORS (mobility aid tie down and seat belt) as compulsory or optional.

Data analysis

Review pertinent information from websites and literature on passenger feedback on the use / non-use of WTORS on public buses. Descriptive statistics will be used to summarise the data to indicate overall trends of participant views in relation to the four questions above.

Uni- and multivariate statistics will then be undertaken to make comparisons between the US where WTORS are in use, and Australia where they are generally not in use. Cross comparisons can also be made between the view of people who do and don't use mobility devices.

Phase 2 Questions and Methods:

This phase of the research is to be informed by Phase 1 findings and therefore initiated after Phase 1 is completed. This piece of research will be a longer study requiring a full proposal to be developed and costed. However, a brief outline is provided here. The questions to be answered in this phase are:

4. For bus operators in Australia and internationally who have not implemented a WTORS for their passengers who use mobility devices:

    a. Have these operators considered the implementation of a WTORS?

    b. If so, what were the reasons for not implementing a WTORS?

    c. What systems or processes do they have in place to ensure the safety of their passengers using mobility devices, specifically to prevent the movement or toppling over of devices during transit?

    d. What evidence or research do they have to support not implementing a WTORS?

5. Based on findings from Phase 1, if a restraint system is identified that the Governance Committee is interested in testing in the Victorian context, small-scale engineering experiments will be undertaken to answer questions such as:

    e. How effective is the restraint to overcome lateral and fore-aft G forces for sideways slippage and tipping over?

    f. How much time does it take to put the restraint in operation (and how easy is it to use); and

    g. Is the restraint suitable for retro-fitting in current rolling stock?

Qu.4 Methods will involve three tasks:

1. Identification of a small number of Australian states and countries / cities, and key people in their bus industry association equivalent and bus operators, who are willing to participate in the data collection and may agree to a confidential sharing of the data with the research team and with each other. This will be managed in close consultation with PTV.
2. Questionnaire to elicit contextual and environmental data, followed by
3. In-depth interviews with key personnel as identified in Task 1, asking the questions documented above.

The data will be analysed using mixed-methods to first qualitatively to identify key themes and issues, and then quantitatively to summarise the number of times certain responses are given.

Qu. 5 Methods will include our engineering colleagues and potentially involve small-scale engineering trials, and computer based virtual testing in 3D.

As an example, if the Governance Committee identify the need for testing of WTORS, we will undertake simulation studies using LS-Dyna and MADYMO (MAthematical DYnamic MOdels for the analysis of occupant safety systems in the transport industry) accurately quantify accelerations and G-forces in all components which can shed light on the effectiveness of the WTORS when applied with our full range of 35 3D scans of mobility devices created in our 2017/8 research on Mobility Device Access on Bus project (funded by PTV). Further to this, experimental prototypes can be used to run a small number of in-situ tests using a force platform, accelerometers and an anthropometric test dummy, and quantify slip and tip points, both (i) without, and (ii) with WTORS.

Time trials will be undertaken in a bus cabin to determine the time it takes for either the user of the mobility device, or the bus driver (from the time the bus driver leaves the driver seat) to secure the mobility device using the WTORS. An analysis of current bus floors and allocated space locations will be examined to determine feasibility of fitting and retro fitting WTORS systems on buses. A cost analysis of retro, and new-build fitting could also be undertaken.

All data will be analysed quantitatively to record tip points, time taken in minutes, and an engineering feasibility study of retrofit options.

Research Outcomes- Phase 1

1. The primary outcome of this study will be a document detailing what is known concerning use, cost and effectiveness of WTORS on public route buses, across 10 countries, and a series of recommendations for using this evidence in the Victorian bus context.
2. A secondary outcome will be a comparison of views of public bus customers who don't use mobility devices with those who do use mobility devices in two countries: Australia (where WTOTS are not used) and USA (where WTORS are used), concerning key issues of safe transit, and transit timeframes (and noting local conditions and operating environments).

Governance Committee (progress reports and presentation of findings to inform phase 2)

To appraise the PTV committee of interim findings, progress and potential areas for the Phase 2 research program, Zoom-based (video-conference) meetings will be every second week, with a Governance Committee comprising the CQU researchers a PTV staff member and Governance Committee member. Thus ~4 meetings will be undertaken across the Phase 1 research program. This approach means that the Governance Committee with be engaged in developments throughout Phase 1 (using an Action Research Approach) and have the opportunity to provide input to shape the development of the Phase 2 work program in the interim stages of the two phases. If required and necessary to further collaborative planning, a presentation of research findings may also be made to the Governance Committee, on conclusion of the Phase 1.