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National Transport Commission

Level 3/600 Bourke Street

MELBOURNE

VIC 3000

**Review of Guidelines for trials of automated vehicles in Australia – Discussion Paper**

The Royal Automobile Club of Queensland (RACQ) and Redland City Council thanks the National Transport Commission for the opportunity to provide this submission to the ‘*Review of Guidelines for Trials of Automated Vehicles in Australia’ Discussion Paper*. This submission has been provided as a joint response from the two partners who delivered the Redlands Coast Smart Mobility Trial with the RACQ Smart Shuttle, which was the first deployment of an autonomous vehicle (AV) in a live traffic environment in Queensland. The trial operated from November 2019 – March 2020 on Karragarra Island within the Redland City Council local government area.

General feedback on the usefulness, relevance, and application of the guidelines is outlined below for your consideration:

* The guidelines lack inclusion of specific details that would be required, helpful, or informative in terms of preparing a permit application.
  + This could be improved if the guidelines provided specific information, such as applicable legislation – in particular disability and accessibility legislation as this was a significant aspect of the Karragarra Island permit application which wasn’t initially identified in the planning stages.
* The current guidelines seem primarily focussed on private (non-public) AV testing and are limited in consideration of application to shuttles, public transport, or commercial services.
  + Greater guidance for deploying shuttles for passenger transport services should be integrated into the document.
* The obligation on State Government’s to adopt and implement the guidelines is unclear. As it is not legislated, unless State’s publish their processes/frameworks or intent to use the guidelines, there will be ongoing barriers related to State-based implementation and nuances.
  + To provide transparency for application of the guidelines it would be valuable if each State and Territory Government published details of how they’re adopting the guidelines and aligned this to a strategic vision and objectives for integrating automated vehicles into the network.
  + Where State or territories differ in requirements from the guidelines regarding legislation, insurance, and other application information, it should be made clear and specific alternative guidelines should be stated.

Responses to relevant questions have been detailed in the body of this submission. RACQ and Redland City Council thanks the NTC for the opportunity to provide this submission and contribute to shaping the future of Australia’s transport network. Should you need to discuss any of the items raised in this submission, please feel free to contact me.

Yours sincerely



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1. Should the guidelines be updated to improve the management of trials (section 3 of the guidelines) and, if so, why? Consider in particular:

* the standard of evidence required in a traffic management plan
* the definition of ‘trial location’ (ODD/route/roads/maps)
* the stakeholders trialling organisations should engage with
* the requirements to state the purpose of a trial

**Standard of Evidence in a Traffic Management Plan**

For the Karragarra Island trial, the traffic management plan functioned as an overarching implementation plan for all traffic management risk identification and mitigations. The difficulty with this requirement is that traffic Management plans in Queensland must be signed off by a TMR accredited Traffic Management Designer, which can result in significant additional costs as a specialist skill set is required to approve every amendment and review to the entire TMP. Typically TMPs are prepared for specific actions, such as temporary road closures and installing temporary traffic management devices. In comparison, AV trials require long term measures across the deployment footprint, in this regard the guidelines could provide greater explanation or detail about the different accreditations and greater clarity on the role and purpose of documentation during the permitting process.

For example a high level Traffic Management Plan showing intended measures to be implemented over a deployment footprint should be sufficient during permitting process and a more detailed TMP (signed by an accredited professional) be required prior to deployment.

**Definition of Trial Location**

The trialling organisations do not object to the suggestion to update the guidelines to state that trial location could either be specific roads, routes or regions and/or the vehicle’s ODD. It should be noted that depending on the trial ODD, route or roads and relevant road owners, approvals may involve further engagement and approvals from private organisations (e.g. toll road operators, land owners) or local councils.

**Stakeholders and Engagement**

The guidelines currently require the trialling organisation to set out how they intend to engage with other key stakeholders and the public. There is an important distinction between the guidelines and how this aspect was implemented in the trial application. Through the Karragarra trial, rather than implementing as per the guidelines and allowing the trialling organisations to set out their engagement intentions, the approving agency had an onerous level of oversight and embedded it as part of the permitting process when it should be a stand-alone element with the trialling organisations deciding the engagement approach. The guidelines and agencies should not dictate how trialling organisations are required to engage with stakeholders or members of the public.

Regarding the NTC’s suggestion that engagement with enforcement agencies be specified in the guidelines, this should be part of the approval process (i.e. permitting) and despite not being referenced in the guidelines, for a trial on public roads this currently requires engagement with enforcement agencies (as discussed below). The guidelines should indicate the type of additional permits or approvals required from agencies other than road authorities. The permitting is one component of the project and the operational aspects of the trial such as broader stakeholder/public engagement should be left to the trialling organisations to manage. Additionally, police involvement may vary depending on whether the trial is located on public or private road-space/land. A table in the guidelines showing possible stakeholders and approval requirements could help to communicate this aspect in a simple and easy to interpret manner.

In relation to the Karragarra trial, the Queensland Department of Transport and Main Roads (TMR) advised the requirement for early engagement with the Queensland Police Service (QPS). While the permit did not explicitly state that a QPS permit was required, the shuttles failure to comply with Australian Design Rules meant it had to be registered as part of the [Conditional Registration Scheme](https://apac01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.qld.gov.au%2Ftransport%2Fregistration%2Fregister%2Fconditional%2Fabout-conditional&data=02%7C01%7CRebecca.Michael%40racq.com.au%7C28d95399747449a4c78908d6235e328b%7Cb820cdba7d5f474582266715f26a5e8f%7C0%7C0%7C636735284915767337&sdata=0wHDlmOcRB6kozhN5F2nvlwRsRoAmOck8nfcgPiYLPE%3D&reserved=0) (CRS) (as a people mover).

The benefit of conditional registration is that the vehicle would receive number plates, which contributes significantly to legitimising its place in the road environment. The vehicle would also receive a policy of Compulsory Third Party (CTP) insurance.

For the shuttle to be part of the CRS, it needed comply with all conditions relevant to the vehicle type. In the case of a People Mover, access to the road would be limited to three conditions:

* LO3 – vehicle use restricted to within a designated area with landowner approval (Karragarra Island as a whole is not a designated area);
* LO6A – vehicle use restricted to within a designated route with **road owner and police approval**; and
* LO7 – vehicle use restricted to loading and unloading (from another vehicle or trailer) only, with a maximum use on road of up to 100m.

Despite engaging with the local QPS early in the process, the application for a general police permit was initially rejected on the basis that the vehicle wasn’t registered and advice from QPS was that a permit would also be required from the National Heavy Vehicle Regulator. A circular problem was realised, as the conditional permit from TMR required an approved police permit before the vehicle could be registered. This misalignment in TMR and QPS’ requirements delayed the project and could have been avoided if the permit guidelines included both a requirement to engage with police as well as a list of responsibilities and evaluation and approval frameworks for all regulating bodies (police, road manager and approving jurisdiction) involved in the permit process.

**Requirement to State the Purpose of a Trial**

The suggested change to add a requirement in the guidelines for trialling organisations to explain the purpose of their trial, is supported. This could assist trial operators by allowing them to identify and learn from trials with a similar intent, and allow decision makers to ensure trials align with their strategic intent for AV incorporation into the network, and also potentially provide additional advice to trialling organisations to improve alignment between the trial’s design and intended purpose/objectives.

1. Should the guidelines be updated to improve the safety management of trials (section 4 of the guidelines) and, if so, why? Consider in particular:

* the standard of evidence required
* human driver or operator inattention
* road user behaviour that does not comply with road rules
* interaction with enforcement and emergency services
* pre-trial testing
* first-supply criteria (appendix A)

**Standard of Evidence Required (Safety Management Plan)**

Please see response to the traffic management plan question.

**Human Driver or Operator Inattention**

The Karragarra Trial was undertaken as a public transport service which required operator accreditation and licensing consistent with the Queensland Government’s *Transport Operations (Passenger Transport) Act 1994*. As per the Department of Transport and Main Road’s information bulletin related to driver responsibilities (PT-307-09-18), ‘authorised drivers must operate vehicles safely and be aware of their surroundings’. Therefore, risks associated with human driver or operator inattention were managed through the training and certification of operators.

For a considered response to this, the type of trial (e.g. public transport, rideshare, etc.) may dictate relevant applicable legislation in each jurisdiction which may already have this as a requirement. This should be evaluated to identify any gaps in potential trial applications and legislation requirements. Additionally, depending on the vehicle’s level of automation (level 3/conditional) this would be more of a risk compared to higher automated vehicles (level 4+) which should theoretically not require a driver/operator to intervene.

**Non-compliant Road User Behaviour**

The proposed change to the guidelines to explicitly require trialling organisations to consider unpredictable behaviour such as driver, rider and pedestrian noncompliance with the road rules, is not definitively supported. It could encourage an overly risk-averse response from the approving agencies if every theoretical scenario cannot be mitigated. Non-compliance risks are currently present for all human-driven vehicles operating on the road network and are not always adequately managed by the road operators as treatments such as installing pedestrian fencing, segregated bike lanes, or other management infrastructure is cost prohibitive or not feasible in some environments. This kind of evaluation may be more appropriate if operating in particular areas with high volumes of vulnerable road users (e.g. major cycle routes, school zones, shared zones, high pedestrian activity areas, etc.).

This risk was adequately managed for the Karragarra trial as the behaviour of other road users, their *likely* interaction with the trial vehicle, and incident management/risk mitigation measures, were detailed in both the Site Assessment Report, the Traffic Management Plan and the Operational Risk Assessment. All of these assessments were a requirement of the Queensland permit application process. The impetus should be on the trialling organisation’s procedures and protocols to describe how they intend to operate in a safe and compliant manner.

Throughout the trial, it was a condition of the permit that TMR were to be notified of any serious incident and provide a report within 7 days detailing the incident as well as what action was being taken to prevent similar incidents from occurring.

**Interaction with Enforcement and Emergency Services**

The NTC’s suggestion to update the guidelines to reference interaction with enforcement and emergency services as part of the safety management plan, is supported only through the addition of the include a high-level requirement where an operator/fall-back ready user is employed in all operations (e.g. require the trialling organisation ‘to consider interaction with enforcement and emergency services on the road and at the roadside’).

The alternative suggestion to specify requirements for interaction (such as those contained in Figure 1 below) would be overly prescriptive in many trials, and while the intention may be to more closely align with the first supply criteria, these criteria were designed for the ADSE to self-certify against. Inclusion in the guidelines may lead to these being scrutinised to a greater degree than a self-certification process, and additionally it is important to note that the trialling organisations will not in all cases be the ADSE and therefore it may be unreasonable or onerous for them to respond to some of the suggested requirements, other than directing the agency to the ADSE for access to information.

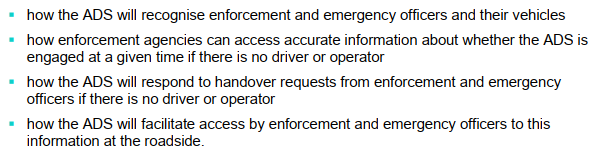


Figure 1: NTC suggested requirements for interaction with emergency services

While this was not specifically assessed as part of the Karragarra trial, the obligation to respond to emergency vehicles or enforcement officers would be the responsibility of the chaperone who would engage manual mode and remove the shuttle to the side of the road. This response would be adequate for the suggested high-level guidelines update.

However, it is recognised that the capability for the ADS to recognise enforcement/emergency vehicles becomes critical in trials without an operator. In these cases, additional prescriptive requirements may be more appropriate.

**Pre-trial Testing**

The NTC’s suggestion that it continue to be up to the trialling organisation to show it has undertaken appropriate pre-trial testing, in any jurisdiction, but that it should be at the state or territory’s discretion to require further testing even where similar tests have been undertaken, is partially supported with preference for emphasis on recognising previous pre-trial testing. Unless there are significant changes to the ODD or a vehicle’s capabilities between trials, pre-trial testing should not be required if a vehicle has already completed a successful deployment in Australia under similar operating circumstances. If it’s known how a vehicle operates, or its capability (within Australia), then additional pre-trial testing seems redundant.

Suppliers of autonomous trial vehicles (Navya, EasyMile), rely on kilometres travelled in numerous overseas deployments and trials as evidence of the vehicle’s capability. Notwithstanding, jurisdictions require dynamic vehicle tests to ensure that the vehicle can replicate its safety functions and operational capability in trial environment conditions. With driving environments varying both domestically and internationally, it is reasonable that jurisdictions require local vehicle tests particularly where ODD and vehicle or trial conditions have notably changed.

Notwithstanding the previous point, it is important that approving jurisdictions prescribe and make requirements for any additional tests known early in the permit application process. This is important for two reasons. Firstly, the capacity of a vehicle to meet the dynamic vehicle tests related to a trial location can be assessed during the procurement process which ensures that the vehicle will be fit for task. Secondly, most, if not all, autonomous vehicle suppliers are based overseas and engineers are sent to perform vehicle tests as often the operator is not yet accredited to chaperone the vehicle. Attending engineers represent a significant cost to the trial proponents). If jurisdictions require additional vehicle tests at a later date in the permit process, this will result in increased costs, delays to the deployment timeline and logistics issues.

#### What issues have been encountered when obtaining or providing insurance?

The recommendation to retain a high-level requirement to hold appropriate insurance remains appropriate for trials of emerging technology is supported though additional guidance on availability and types/amounts would be beneficial (discussed below). Different jurisdictions have varying insurance frameworks (e.g. at-fault, no-fault), and trials have varying levels of risk associated. It is therefore reasonable to expect insurance may vary state to state and trial to trial.

For the Karragarra trial, insurance arrangements were complicated by the operator (Redland City Council) being a separate entity to the trial vehicle owner (RACQ).

RACQ decided to insure the vehicle through Allianz who had insured several Easy Mile autonomous vehicles for trial purposes. RACQ did not insure through our own insurer due to the vehicle being under conditional registration. The Allianz policy covered the cost of the vehicle and third-party damage up to $20,000,000.

RACQ also requested that RCC hold the following insurance as the vehicle operator:

* Public liability insurance
* Professional indemnity
* Professional indemnity insurance
* Workers compensation insurance

Finally, the MOU between RACQ and RCC provided mutual indemnity for any liability

Despite having an inhouse insurance company providing advice and guidance, navigating insurance arrangements was complex. Appropriate insurance cover is critical to minimising exposure to risk and it is recommended that the trial guidelines make clear what insurance is required and the possible gaps in insurance cover for autonomous vehicle trials.

Since the Karragarra Island trial, it has been advised by the trialling organisation’s insurer than there is greater flexibility in the insurance market now which should make the insurance component easier for future deployments.

1. Are the current insurance requirements sufficient (section 5 of the guidelines)? If not, how should they change?

The adequacy of insurance requirements and arrangements will be impacted by the nature of the CTP scheme in the jurisdiction where the trial is located. For example, the CTP scheme in Queensland is an “at fault” scheme where a road user injured as a result of a motor vehicle crash will not be covered by CTP insurance if they can’t blame another driver/vehicle for their injuries. It remains unclear and untested whether CTP insurance in all states would provide cover if, following an incident involving the vehicle causing incident, the ADS was deemed to be in control of the vehicle and at fault. It is also unclear how the ADS interface with the on-board operator would impact insurance arrangements and the determination of fault.

This may be rectified following legislative reforms to allow an ADS to drive an automated vehicle in place of a human, and subject to further approvals – create provisions enabling people involved in an automated vehicle crash to access MAII schemes.

1. Should the guidelines be updated to improve the provision of relevant data and information (section 6 of the guidelines)? Consider in particular:

* Disengagements
* Serious and other incidents and consistency of reporting requirements
* serious incidents definition and reporting
* broader data reporting requirements
* research outcomes, end-of-trial report, sensitive information

**Disengagements and Serious/Other Incidents – Consistency, Reporting & Definitions**

The suggestion for the guidelines to specify a monthly reporting requirement for ‘disengagements’ in vehicles without a human operator as well, is supported for safety management and reporting consistency across trials.

Consistency in reporting may be a function of whether definitions are provided to guide incident reporting. In the Karragarra trial, the jurisdiction required monthly reports throughout the trial detailing patronage, serious and non-serious incidents and remediation action taken (as well as other information as required). Emergency stops (e-stops) were specified as a non-serious incident and were subsequently reported.

It soon became apparent that TMR defined e-stops as an indicator of a “near miss”. This is a very broad definition and doesn’t acknowledge that it is actually a measure of the AV’s safety chain response to external stimuli. This safety chain is programmed to trigger an e-stop when an object is detected within its safety zone (which is very conservative), but this does not necessarily translate into an immediate risk of a collision or serious incident – e-stops can be triggered by vegetation on the side of the road or birds flying in front of the vehicle.

It should also be recognised that disengagements or e-stops are evidence that the system is operating as intended and safely by responding in the expected way during an event that is not within the ODD or vehicle's capabilities to respond to safely.

**Broader Data Reporting Requirements**

The NTC’s position that the guidelines strike a balance between high-level guidance and prescription in relation to incident reporting by stating the information that should be reported to the road transport agency but not explicitly stating types of data that should be recorded, is supported.

While it is understood the guideline updates are attempting to more closely align with the first supply criteria to facilitate commercial deployment, this may not be practical for most trials as noted earlier the ADSE may not be the vehicle owner/operator and regularly involved in the trial. Additionally, sharing of this data by the ADSE without involvement of the vehicle owner/operator undertaking the trial may breach commercial arrangements. The suggestion to further align with the safety criteria for commercial deployment by having some basic requirements on trialling organisations to show how they will record relevant data (examples shown in Figure 2) may not be practical for all trialling organisations – particularly those which do not intend to scale up to a commercial deployment model. Whether or not the ADSE is a trialling organisation, and whether or not the trial will evolve to commercial deployment should be considered before applying additional and potentially onerous data reporting requirements.

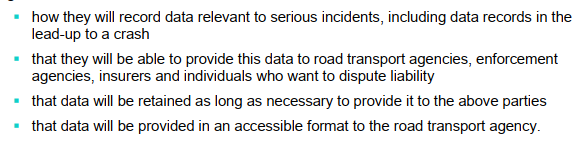


Figure 2: NTC suggested data reporting requirements

**Research Outcomes, End of Trial Report and Sensitive Information**

The suggestion guidance about what could be included in an end-of-trial report is supported. This could be streamlined by developing a template for reporting requirements and would be helpful to trialling agencies to ensure less cumbersome reporting requirements.

Regarding sensitive information, we consider a potential solution would be to implement a provision in the application process for all parties to agree on reporting requirements, particularly those related, prior to the commencement of the trial. This may also include agreements related to prohibiting sharing/release/publication of sensitive information.

1. Is there any additional information the guidelines should include for trialling organisations?

The guidelines currently contain no information about skill sets required to prepare an application, facilitate or implement trials (e.g. traffic engineers). Outlining skillsets required for application elements would assist trialling organisations with evaluating whether they have the skills or funds to outsource where required, and thereby evaluate the overall viability.

It would also be valuable if the guidelines provided examples (e.g. from other trials) of any partnerships that were required for a successful trial. This would provide greater context of the work involved to deploy an AV, particularly for non-service provider agencies (i.e. local governments).

1. Should the guidelines apply to any other emerging technologies (discussed in chapter 4 or other technologies) and operating domains?

In the rapidly evolving mobility technology environment, where emerging technologies have no alternative reference point, the guidelines could be a valuable starting point and should be flexible to be easily adapted to new technologies.

1. Are there any additional criteria or additional matters relevant to the trials of automated heavy vehicles that should be included in the guidelines?

This question is not applicable to the trial which was undertaken by the partnership.

1. Are there currently any regulatory or other barriers to running larger trials? If so, how should these barriers be addressed? (Consider the guidelines, state and territory exemption and permit schemes, and Commonwealth importation processes.)

Regarding larger public transport trials of AVs, it is unlikely a transport service provider would seek to integrate AVs until there is support or direction from the regulating authority to do so. This includes overcoming the current barrier where alternative operators face significant barriers to operating in legislated contract areas where current public transport operators exist. While this barrier exists, the impetus should be on state government agencies to lead or coordinate the delivery of larger public transport trials – though this exclusive contracting arrangement in the legislation should be reviewed and updated to allow for flexible trialling of alternative mobility options.

We are not currently able to comment on additional barriers to running larger trials not related to public transport applications.

1. Should the guidelines continue to allow commercial passenger services in automated vehicle trials? If so, should the guidelines reference additional criteria that trialling organisations should be subject to, and what should these criteria be?

If the desire is to establish a framework to allow the integration of AVs into the transport network, then yes it makes sense for the guidelines to include provisions for commercial passenger services. While these provisions would be broad, they should at least inform the various state and territory governments on measures need to be developed to enable these services.

Additionally, a definition related to commercial passenger services would be valuable to distinguish between local research trials which offer a passenger service (as we did with Karragarra) and those with the intent of scaling up to commercial deployment and/or competing with local commercial modes such as rideshare/taxis. Those which fall into the second category should be subject to provisions which more closely align to the first supply principles – some of these criteria are recognised in earlier questions (e.g. broader data reporting requirements, and potentially interaction with emergency/enforcement.

Broader industry engagement with operators who are currently or may be interested in undertaking commercial deployments should be undertaken to determine the barriers (e.g. lack of government direction, costs, inexperience with technology) and potential solutions (e.g. partnerships, research grants, trials).

1. What challenges have you faced with administrative processes when applying for approving trials of automated vehicles, and how could these be addressed?

Throughout the permit and trial application process there was a lack of clear and understandable directions from regulators. A potential solution to this would be to develop and adopt a framework that enables consistent advice and transparent decision making across all organisations/agencies.

1. Are there any other barriers to cross-border trials? Is there a need to change current arrangements for cross border trials?

Legislative differences across states exist – some of which have been covered or noted previously such as insurance, public transport operator and disability access for public transport operations legislation. There are also potentially state based jurisdictional differences for taxi/rideshare legislation which may be a barrier, but this trial did not have experience with this, or cross-border operations.

While local government boundaries do not have specific legislative challenges, the public transport operator contract areas are legislated and often have boundaries in-line with local government areas. This is a challenge for even non-AV operations in Queensland, with some services not being able to be altered to extend into another contract area within another LGA. Additionally, LGA boundaries would require multiple stakeholder agreements if operating on local roads across multiple LGAs, and not led by State government.

1. Should there be a more standardised government evaluation framework for automated vehicle trials? If so, what are the trial issues that should be evaluated?

The concept of a standardised government evaluation framework for AV trials is supported and as stated previously should provide clear and consistent advice and decision making from regulators.

1. Should the results of evaluations be shared between states and territories? If so, how should commercially sensitive information be treated?

The benefits of sharing information are recognised and supported. A standardised final reporting framework, with case-by-case agreements related to protections for certain information could resolve any issues with IP or sensitive information.

1. What works well in the automated vehicle importation process, and what are the challenges?

Application of the Luxury Car Tax (LCT) to a trial vehicle depends on the number of passengers, with the LCT rules applying where the vehicle is designed to carry fewer than nine passengers. This reading of the LCT rules was supported by internal tax advice which also indicated that the GST payable on the trial vehicle was fully claimable.

Two documents were required to support the importation of the autonomous shuttle:

* 1. Letter from RACQ outlining the trial project, purpose of the vehicle and VIN
  2. Letter from the jurisdiction (TMR) providing in principle support for the vehicle and trial

The importation process was made easier by contracting the process to the autonomous shuttle supplier.

A challenge to the shipping and import process was all parties understanding and agreeing to when various insurance cover and arrangements would apply.

1. Is there anything further that should be done to facilitate a transition from trial to commercial deployment?

State governments need to support trials and implementation to enable successful commercial deployment. There is a lack of clarity, decisions, and information from TMR about implementing AVs into the network or what they intend to do to enable future deployments. Providing an overarching vision or set of objectives regarding how they intend to integrate AVs would provide greater certainty and direction for businesses considering larger trials and commercial deployments. However it should be noted some businesses or organisations looking to trial may have had limited visibility of the NTC’s AV reform work to date and be unaware of the safety assurance system and intent to implement legislative reform and introduce the first supply criteria and in-service requirements on the ADSE.

1. Are there any matters that the NTC should consider in its review of the guidelines?

It is recommended the guidelines review should include:

* Clear and agreed definitions
* Flow charts (to avoid logic failures such as the circular QPS/TMR registration permitting issue)
* Templates where possible (e.g. importation letters)
* Guidance on accessibility legislative requirements and when they are applicable as these have potentially far reaching impacts on the design, uptake and viability of AV technology and need to be addressed throughout the trial design and application, for example:
  + Disability Standard for Accessible Public Transport 2002 (relevant to public transport trials)
  + Disability Discrimination Act 1992 (relevant to other public facing or commercial trials)