Trackless trams

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Part of the Tranzinfo Hot Topics series, this issue offers a selection of material on what are known as trackless trams: battery electric, articulated vehicles designed to look like trams that require no rails or overhead wires. The trackless tram uses an autonomous optical guidance system, travels on rubber tyres in a dedicated corridor, and is bi-directional. Trackless trams have been promoted as a cheaper, faster and cleaner alternative to light rail and bus rapid transit. However, concerns have been raised over their viability, including the high establishment costs, the risks of a unique and largely unproven technology, and the weight of the vehicles potentially damaging the road surface.

Contents:

The technology

Frequently asked questions and the myths of trackless trams
Verschuer, M, Sustainable Built Environment National Research Centre Australia, 2020
Frequently asked questions have been compiled to assist those interested in Trackless Trams better understand the advantages and limitation of the technology and the areas where further research is needed.

Do Trackless Trams need stronger roads? – the "weight" of evidence
Reynolds, J, Pham, D & Currie, G, Australasian Transport Research Forum 2021 Proceedings, 8-10 December, Brisbane, Australia.

Trackless Trams are a new generation of advanced bus technologies with significant potential for application as a cost-effective alternative to Light Rail Transit. However, they are very heavy vehicles that have the potential to cause pavement damage, suggesting a need for road strengthening works. This paper explores the road pavement impacts of new Trackless Tram bus technologies.

Trackless trams or guided electric vehicles?
GTA Consultants, 2020
Guided Electric Transit Systems (GETS) represent a class of public transport options that would be a new technology for Australia. In the media, they have been referred to as "trackless trams", but they represent much more than that.

Debunking the myths around optically-guided bus (trackless trams)
Wong, YZ, BusNSW Bulletin, December 2018
The optically-guided bus is the latest in a long line of initiatives to repackage existing buses as premium rail-based technology. The name 'trackless trams', design of the vehicles and modest deployment cost has appealed to many, and the concept has gained traction in Australia. However, a certain level of dogma fuelled by some wilder claims about the technology and its potential has taken hold. Many misconceptions have been promulgated, leading to a need to set out the facts and debunk the myths.

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Pros and cons

How trackless trams could help revitalize city suburbs
World Economic Forum, 13 September 2022
Installing trackless trams can improve access to public transport in middle suburbs, as well as being less costly than light rail, faster than buses, and carbon-neutral and flexible, according to Curtin University academics.

Report highlights transformational impact of light rail, warns against trackless trams gamble
Australasian Railway Association (ARA), 8 June 2021
Trackless trams technology is unproven, untested, and unreliable, and overseas failures should serve as a warning to Australian jurisdictions, according to a new report released by the Australasian Railway Association (ARA).

Are trackless trams really ready to replace light rail?
Public Transport Association of Canberra, 14 November 2021
The Trackless Tram is currently being sold as a replacement for traditional public transport technology such as light rail. It does so by claiming to be cheaper and easier to install, while still giving the impression of being a high-

quality system. Yet there are many reasons to be sceptical of claims that Trackless Trams are ready to replace light rail.

Introducing the 21st century boulevard: a post-covid response to urban regeneration of main road corridors.
Newman, P, Hargroves, K, Desha, C & Izadpanahi, P 2021, Current Urban Studies, 9, pp. 831-54.
As city leaders contemplate the post-COVID-19 urban regeneration, Parisian Boulevards from the 17th Century provide inspiration, from their combination of mobility with pedestrian, nature and place-based qualities. This paper proposes a new concept called "21st Century Boulevards" to support local and regional authorities in achieving urban regeneration using such qualities together with new technology such as trackless trams.

Trackless trams – pros and cons
Bowen, D, Railpage, November 2021
Trackless Trams have potential. But doubts remain around the costs, and most importantly the risk of an immature, orphan, proprietary technology. The Victorian Government needs to tread very carefully if it is to consider this option.

Leapfrog technology and how it applies to trackless tram
Ndlovu, V & Newman, P 2020, Journal of Transportation Technologies 10, pp. 198-213.
Rapid innovation and development of modern technology has brought about the opportunity for developing economies to technologically leapfrog. The smart phone is the most recent example. The paper then examines the new mid-tier transit technology called Trackless Trams and applies six key criteria to it.

Entrepreneurial transit and urban regeneration: the entrepreneurial rail revival, transit activated corridors and trackless trams
Davies-Slate, Sebastian, PhD thesis, Curtin University, 2020
This research investigates entrepreneurial approaches to transit development and emerging transit technologies, and their potential to regenerate cities, foster economic development, relieve pressure on public budgets and reduce our environmental impact.

From TOD to TAC: the transport policy shift to Transit Activated Corridors along main roads with new technology transit systems.
Newman, P et al., Curtin University Sustainability Policy Institute (CUSP), Curtin University, Perth, Australia, 2020.
Despite growing levels of congestion and increasing travel times large parts of the inner, middle and outer suburbs of many cities remain poorly serviced by transit options that do not compete with cars and which do not enable urban regeneration. A new model is outlined to address this double-sided issue called Transit Activated Corridors (TAC) that uses new transit technology along main road corridors to both compete with cars and to facilitate a string of urban regeneration in precincts using private sector funding.

Trackless trams and Australian urban fabric
Newman, P, Mouritz, M, Verschuer, M, Davies-Slate, S, Caldera, S, Desha, C & Reid, S 2019, State of Australian Cities Conference, 3-5 Dec 2019, Perth, Australia.
There is growing interest in the concept of Trackless Trams as part of the suite of transport technologies available to help shape more urban outcomes. However, there is much more for decision-makers to consider than the vehicle itself. This paper discusses both the city shaping possibilities of these systems and the challenges and opportunities inherent in integrating new technologies into existing city systems.

Sustainable centres of tomorrow: a precinct design framework of principles and practices
Caldera, S, Desha, C, Reid, S, Newman, P & Mouritz, M 2019, Report for project 1.62 Sustainable centres of Tomorrow: People and Place, Sustainable Built Environment National Research Centre.
The Sustainable Built Environment National Research Centre (SBEnrc) has been conducting research on how cities regenerate and create new centres by integrating new forms of transit along streets (using Trackless Trams) with urban regeneration around stations.

Delivering integrated transit, land development and finance – a guide and manual with application to trackless trams
Newman, P, Mouritz, M, Davies-Slate, S, Jones, E, Hargroves, K, Sharma, R & Adams, D 2018, Sustainable Built Environment National Research Centre (SBEnrc), Australia.
Most cities want more and better public transport along with more lively, productive and sustainable centres, especially in the suburbs. Most cities want to integrate this transit and land-use. But how? This report shows how transit-land development integration has been happening around the world using funding and finance as the glue. This is the core idea of our research on how to procure transit in cities in the 21st century, with a focus on Australian cities and within the context of rapidly changing technology especially the Trackless Tram.

Caution needed over trackless trains
Greater Auckland Inc, 2018
To provide more capacity than normal buses, the current fascination is a concept out of China dubbed 'trackless trains.' In essence this is an electric, articulated, guided bus. The idea has been getting plenty of press recently but is really just the latest in a long line of ideas to repackage existing bus technology and give it a new look and a new name. It's easy to see why the idea is appealing to many, it looks almost identical to modern light rail vehicles, has a lot of capacity but is much cheaper to build/install. The idea seems almost too good to be true, and it might just be.

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Trials/potential in Australia

Stirling to welcome trackless tram as part of Australian-first trial with Curtin University
PerthNow, 31 March 2022
A trackless tram will be trialled in Perth's City of Stirling, with the aim of providing sustainable transport that is less disruptive and more cost effective to build while retaining the benefits of light rail.

Brisbane confirms order for 60 all-electric "trackless trams" with flash charging
The Driven, August 8, 2022
Following extensive on-road testing, Brisbane City Council's 'Brisbane Metro' project has officially placed an order with Swiss manufacturer Hess for 60 high-capacity battery electric "trackless trams".

Caulfield-Rowville trackless rapid transit
Monash University, website, 2022
Caulfield-Rowville Trackless Rapid Transit (TRT) is a joint proposal by Monash University and Vicinity Centres to create an innovative transport solution for Melbourne's South-Eastern Economic Corridor.

Melbourne's next generation trams could be trackless with rubber wheels
The Age, 2 May 2021
According to some experts, Melbourne's new tram fleet should include trackless-trams, battery-powered vehicles with rubber wheels that use sensors rather than steel tracks.

Understanding trackless tram technology and its potential future role in Sydney's transport planning
Bennett, D, National Traffic & Transport Conference Abstracts 2021
Due to financial constraints and the NSW government's existing expenditure on transport projects, delivery of additional infrastructure has proven difficult. Large-scale transport projects such as Sydney Metro have received priority over cross-regional transit projects such as Parramatta Light Rail Stage 2. In this context, it could be argued that there is a need to consider alternative, cost-effective cross-regional transport infrastructure in Sydney. This study investigates the feasibility of trackless tram technology as a viable cross-regional public transport alternative in Sydney.

Transport equity considerations of a 'Trackless Tram-Entrepreneur Rail Model'
Lawrie, I, Australian Planner, vol. 56, no. 4, 2020
New 'trackless tram' technology offers potential for cheaper deployment of high-quality public transport. This paper discusses planning and equity challenges inherent in Peter Newman's Trackless Tram Entrepreneur Rail Model (TT-ERM) where public transport is delivered by the private sector, paid for by the profits of closely aligned real estate development. Although the concept offers potentially positive urban outcomes, an uneasy co-existence between private, integrated transport and land use development adjacent

to legacy urban form likely limits viability of the model. Referencing past urban experiences, solutions are offered which maximise the positive opportunity of trackless trams for Australian cities.

Townsville Metro: unlocking urban potential through improving a key transit corridor
Caldera, S, Desha, C, Reid, S, Yen, B, Shearer, H, Newman, P & Mouritz, M 2020, Report for Project 1.62 Sustainable Centres of Tomorrow: People and Place, Sustainable Built Environment National Research Centre, Australia.
A place-making evaluation framework has been developed to inform project-specific business cases as they may arise through a City Deal or other ventures. Using the framework, trackless tram technology is being evaluated in several case study sites around Australia (Melbourne, Sydney, Perth), as an emergent transport catalyst to 'unlock the urban potential' between and around urban 'nodes' (i.e. transit stops).

Researchers say economic and environmental benefits could flow from trackless tram in Townsville
ABC News, 17 July 2020
A trackless tram network could bring social, economic, and environmental benefits to Townsville, according to new research.

Trackless trams an option for Sydney's boom precinct
The Age, 11 November 2019
The NSW Government is in discussions with the City of Sydney about operating trackless trams to Green Square.

The trackless tram: is it the transit and city shaping catalyst we have been waiting for?
Newman, P, Hargroves, K, Davies-Slate, S, Conley, D, Verschuer, M, Mouritz, M & Yanka, D 2019, Journal of Transportation Technologies, vol. 9, no. 1, pp. 31-55.
Recent innovations in transport technology are now providing mobility that is cheaper, autonomous, electric, and with improved ride quality. While much of the world's attention has been on how this can be applied to cars, there have been rapid adoption of these and other technologies in High Speed Rail and Metro Rail systems that run between and across cities. This paper shows how such innovations have now been applied to create the next generation of urban transit system called a Trackless Tram. Case studies are outlined for Perth and Thimpu to illustrate its potential.

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